

**EPA Superfund
Record of Decision:**

**SOLITRON MICROWAVE
EPA ID: FLD045459526
OU 01
PORT SALERNO, FL
11/01/2000**

RECORD OF DECISION

Declaration

Site Name and Location

Soliton Microwave NPL Site
Port Salerno, Martin County, Florida
FLD045459526

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Soliton Microwave Site. The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this Site.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the Remedial Investigation (RI) and Feasibility Study (FS) process for the Soliton Microwave Site. In accordance with 40 CFR 300.430, FDEP, as the support agency, has provided input during the RI/FS process and has verbally indicated they concur with the remedy.

Assessment of the Site

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The unacceptable risk associated with this Site is primarily due to the potential future consumption of groundwater containing contaminants above either federal or State of Florida primary groundwater standards. Also, while the soil contamination does not pose a significant health threat, it may act as a source for the groundwater contamination. Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare or the environment.

Description of the Selected Remedy

This remedy addresses threats to the soil and groundwater posed by the environmental conditions at this Site.

The major components of the selected remedy include:

- C extension of public water to homes and businesses within the area about 3/8 mile north and east of the Site;
- C groundwater treatment by in-situ chemical oxidation to supplement monitored natural attenuation;
- C excavation and off site disposal of approximately 330 cubic yards of VOC contaminated soil which is a potential source of groundwater contamination;
- C periodic groundwater monitoring; and
- C deed notices on the Site to prevent consumption of groundwater until cleanup levels have been met and for the evaluation and proper handling of soil under the plant buildings if the buildings are demolished.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

This remedy will allow unlimited future use of the Site, once the cleanup levels have been met. However, it will take at least ten years before the cleanup levels in groundwater are met. Because this remedy will result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure during that 10 year period, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

ROD Data Certification Checklist

The following information is included in the Decision Summary section of the Record of Decision. Additional information can be found in the Administrative Record file for this Site.

- C Chemicals of concern (COCs) and their respective concentrations,
- C Baseline risk represented by the COCs,
- C Cleanup levels established for COCs and the basis for the levels,
- C Current and future land and groundwater assumptions used in the baseline risk assessment and the ROD,
- C Land and groundwater use that will be available at the Site as a result of the Selected Remedy,
- C Estimated capital, operation and maintenance (O&M), and total present worth costs; discount rate; and the number of years over which the remedy cost estimates are projected, and
- C Decisive factors that led to selecting the remedy.



Richard D. Green, Director
Waste Management Division

1 NOV'00

Date

RECORD OF DECISION

Summary of Remedial
Alternative Selection

for the

Soil and Groundwater

at the

Solitron Microwave Site
Port Salerno,
Martin County, Florida

Prepared by the
United States
Environmental
Protection Agency



TABLE OF CONTENTS

1.0 SITE LOCATION AND DESCRIPTION	<u>1-1</u>
2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES	<u>2-1</u>
3.0 COMMUNITY PARTICIPATION	<u>3-1</u>
4.0 SCOPE AND ROLE OF ACTION	<u>4-1</u>
5.0 SITE CHARACTERISTICS	<u>5-1</u>
5.1 Site Area	<u>5-1</u>
5.2 Geology and Hydrogeology	<u>5-1</u>
5.3 Nature and Extent of Contamination	<u>5-4</u>
6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES	<u>6-1</u>
7.0 SUMMARY OF SITE RISKS	<u>7-1</u>
7.1 Contaminants of Concern	<u>7-1</u>
7.2 Exposure Assessment	<u>7-4</u>
7.3 Toxicity Assessment	<u>7-7</u>
7.4 Risk Characterization	<u>7-11</u>
7.5 Environmental Risk	<u>7-14</u>
7.6 Uncertainties	<u>7-15</u>
8.0 REMEDIAL ACTION OBJECTIVES	<u>8-1</u>
9.0 DESCRIPTION OF ALTERNATIVES	<u>9-1</u>
9.1 Description of Remedy Components	<u>9-1</u>
10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES	<u>10-1</u>
11.0 PRINCIPAL THREAT WASTES	<u>11-1</u>
12.0 SELECTED REMEDY	<u>12-1</u>
12.1 Summary of the Rationale for the Selected Remedy	<u>12-1</u>
12.2 Description of the Selected Remedy	<u>12-1</u>
12.3 Summary of the Estimated Remedy Costs	<u>12-4</u>
12.4 Expected Outcome of Selected Remedy	<u>12-6</u>

13.0 STATUTORY DETERMINATIONS	<u>13-1</u>
13.1 Protection of Human Health and the Environment	<u>13-1</u>
13.2 Compliance with ARARs	<u>13-1</u>
13.3 Cost Effectiveness	<u>13-3</u>
13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable	<u>13-3</u>
13.5 Preference for Treatment as a Principal Element	<u>13-3</u>
13.6 Five-Year Review Requirements	<u>13-4</u>
14.0 DOCUMENT OF SIGNIFICANT CHANGES	<u>14-1</u>

1.0 SITE LOCATION AND DESCRIPTION

The Solitron Microwave Site (CERCLIS # FLD045459526) is located on Cove Road approximately $\frac{3}{4}$ miles east of U.S. Highway 1, in Port Salerno, Martin County, Florida, (Figure 1-1). The coordinates are latitude 27E08'12" North and longitude 80E11'57" West on the St. Lucie Inlet, Florida United States Geological Survey (USGS) Quadrangle Map (Figure 1-2).

The Site property comprises almost 20 acres, approximately eight of which were reportedly used for business purposes. Existing on-site features include the main Solitron plant building, a storage shed (former hazardous waste storage building), parking lots, a percolation pond, and two septic fields (located east and west of the plant building). Major site features are shown on Figure 1-3.

ROCKY
POINT COVE

GREAT
POCKET

MANATEE POCKET

PORT SALERNO

BROOK ST. SE

1

SE LINCOLN ST.

SE ISABELITA AVE.
SE JACK AVE.

HALIBUK AVE.

EBBTIDE AVE.

DRIFTWOOD SE GRANT ST.

SE COVE ROAD

SE WINDSONG LN.

SITE

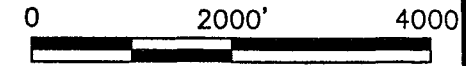
ORANGE STREET

MANOR WAY

MILES GRANT ROAD

SE 4TH AVE.

GRAPHIC SCALE



1" = 2000 FEET

NORTH



SOLITRON MICROWAVE SITE
PORT SALERNO, MARTIN COUNTY, FLORIDA

SITE LOCATION MAP

FIGURE 1-1

ROY F. WESTON, INC.



MANAGERS

DESIGNERS/CONSULTANTS

DRAWN:
M. SNEED

DATE:
8/17/99

W.O. NO.:
20064-039-100-6040

DES. ENG.:

DATE:

CAD NAME:
SITEMAP.DWG



GRAPHIC SCALE
2000' 4000'



1" = 2000 FEET

SOLITRON MICROWAVE SITE
PORT SALERNO,
MARTIN COUNTY, FLORIDA

SITE TOPOGRAPHIC
MAP



DRAWN BY:
E. CRISP

DATE:
20 DEC 99

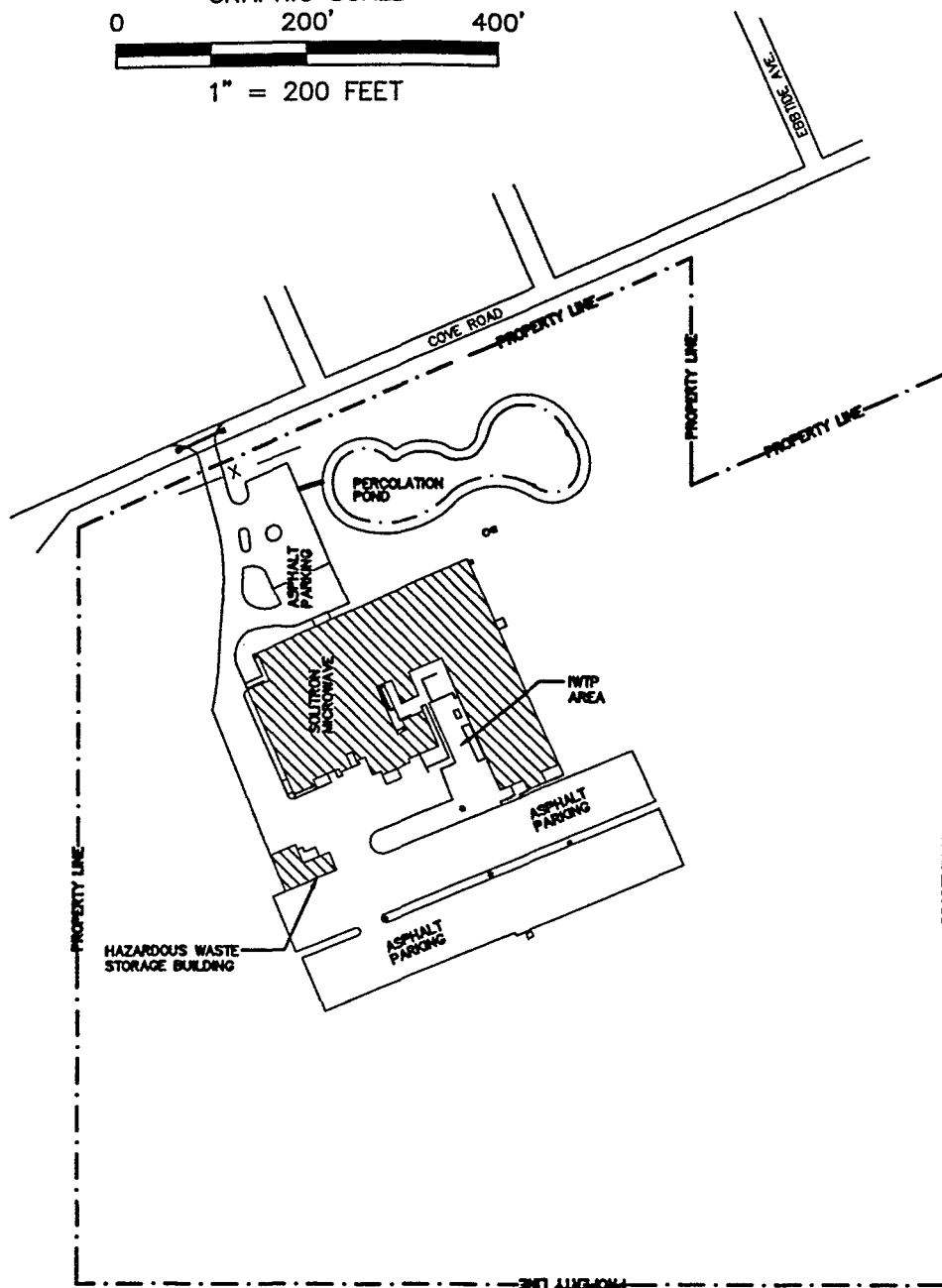
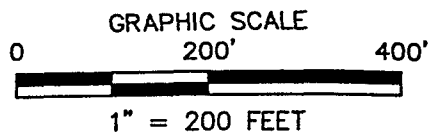
W.O. #:
20064-039-100

CHECKED BY:

DATE:

FILE NAME:

NORTH



GENERAL LEGEND:

- PROPERTY LINE.
- x — x — EXISTING CHAIN-LINK FENCE.
- EXISTING ROADS.

SOLITRON MICROWAVE SITE
PORT SALERNO, MARTIN COUNTY, FLORIDA

MAJOR SITE FEATURES



DRAWN:

DATE:

W.O. NO.:

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Solitron operated a plating and manufacturing business at the Solitron Microwave Site from 1968 until January 1987. The facility manufactured microwave components and miniature size frequency connectors and cable as well as solid state resistor networks associated with electroplating. Prior to that time, from 1963 to 1968, General R.F. Fittings operated the Site. The company reportedly conducted plating operations similar to Solitron's.

Industrial wastes discharged from General R.F. Fittings plating operations were initially processed through an unpermitted treatment system consisting of an acid destruct tank. Until May 1965, all acid and plating room wastes (including solvents) were discharged to a drainage ditch on Cove Road. In May 1965, certain plating room floor drains were diverted to an industrial waste treatment area (IWTP) on-site, and then to the Cove Road drainage ditch. A percolation pond for containing treated waters on-site was installed in 1969/1970, and the existing IWTP was continuously modified and upgraded after 1973. IWTP effluent was simultaneously discharged to the percolation pond and Cove Road ditch from 1970 to 1979, when the pond was expanded and became the sole discharge point. A state permit to operate the modified IWTP for on-site discharge to the percolation pond was first issued in 1978. Monthly monitoring of the system included testing for nickel, iron, copper, zinc, chrome, cyanide, lead, mercury, nickel, selenium, sulfate, pH, and conductivity. This permit expired in 1986, and a second permit was denied by Florida Department of Environmental Protection (FDEP), formerly Florida Department of Environmental Regulation, due to the detection of high concentrations of copper in the percolation pond. The IWTP was dismantled in 1988 following testing of wastewater from five tanks.

During an FDEP inspection in 1981, sand beneath the pipe emanating from a bermed drum storage area was observed to be stained. The soils were reportedly collected and manifested. In November 1983, FDEP observed a number of leaky pipes and contaminated soil from overflow pipes that were periodically uncapped and allowed to drain. Following the inspection, Solitron was instructed to conduct soil and groundwater contamination assessments at the facility. Constituents of concern at this time were primarily cyanides and heavy metals. Based on the results of the assessments, metal concentrations in excess of FDEP cleanup criteria were identified in sediments from the Percolation Pond. Solitron removed approximately 260 cubic yards of sediment from the pond in 1989. Sediments from the former wastewater discharge pond were assessed and remediated to FDEP's satisfaction. Additionally, based on a review of the soil assessment conducted in the IWTP area, FDEP concluded that no further action was necessary in that location.

Monitoring for volatile organic compounds (VOCs), which would provide documentation of the effects of long term dripping and rinse water "drag-out" of organic compounds, did not begin until 1984, when groundwater from 4 monitor wells was sampled for VOCs. From 1988 to 1991, 38 additional PVC monitor wells were installed both on- and off-site to assess groundwater

quality. Tetrachloroethene (PCE), a chemical used at the facility, was generated as a spent solvent during electroplating operations. PCE, trichloroethene (TCE), and their degradation products (e.g., 1,1-dichloroethene [1,1-DCE], cis 1,2-dichloroethene [cis 1,2-DCE], and vinyl chloride) were detected in groundwater sampled from monitor wells on- and off site, as well as several private wells in the Site vicinity at levels above EPA and FDEP maximum contaminant limits (MCLs). The Site was proposed for inclusion on the National Priorities List (NPL) on March 5, 1998 and finalized on the NPL on July 27, 1998.

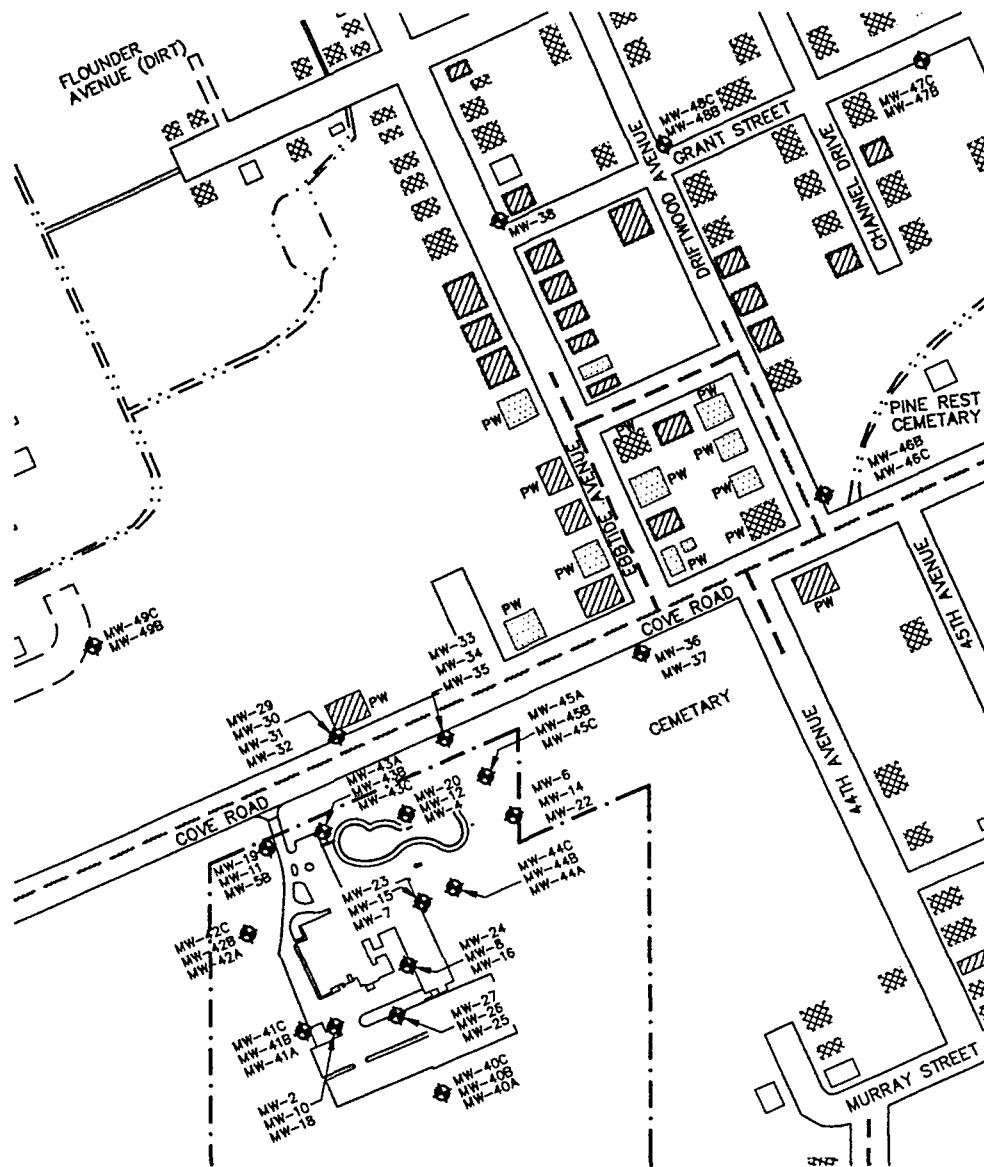
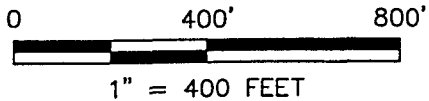
EPA contacted Solitron Devices, Inc., the current owner of the Site, to perform further investigation of the Site and an eventual cleanup. However, EPA ultimately determined that Solitron did not have the financial resources necessary to fund the RI/FS or the cleanup. Therefore, the RI/FS was conducted by EPA with federal money from the Superfund. When the Site is sold, the money (minus real estate fees and attorneys' fees) will be given to the federal government to partially offset EPA's costs incurred during the RI/FS and cleanup.

In 1998, EPA began sampling at the Site as part of the RI. During the RI, EPA tested the soil, sediment, surface water, and groundwater. The first round of groundwater sampling in 1998 included testing of the on-site existing wells that could be located and the use of direct push sampling to sample the groundwater. The results confirmed the presence of groundwater contamination on-site above drinking water standards. EPA conducted additional sampling during the spring of 1999. This sampling included more testing of soil to determine the extent of soil contamination and the installation of 26 additional monitoring wells to test groundwater at different depths both on-site and off site. The various studies at this site have resulted in the installation of groundwater monitoring wells with depths ranging from 15 feet to 140 feet below ground surface. The locations of the monitoring wells is shown on Figure 2-1.

The Martin County Health Department (MCHD) initiated a residential sampling program upon review of contamination assessment reports submitted to FDEP in 1989 and 1991. The MCHD sampled various off site private wells north and east of the Site in 1991, 1992, 1993, 1995, 1998, and 1999. Twelve wells were found to have site related contaminants at levels greater than Florida primary drinking water standards and were connected to the county water supply. The most recent testing was done in the summer of 1999. A total of 87 private wells were tested. Nine of the wells had trace levels of site-related contaminants, but none of the wells exceeded drinking water standards. The results of this sampling are shown on Figure 2-2.

NORTH

GRAPHIC SCALE



GENERAL LEGEND:

— — — PROPERTY LINE.

— . . . WATER

— — — EXISTING PAVED ROADS.

- - - EXISTING DIRT ROADS.

+ + + RAILROAD TRACKS.

MW-38 EXISTING MONITORING WELL LOCATION.

PRIVATE WELLS. SAMPLED, NO CONSTITUENTS OF CONCERN DETECTED.

PRIVATE WELLS. 1,1-DCE, 1,1-DCA, 1,2-DCE, TCE, PCE, AND/OR VINYLCHLORIDE DETECTED BELOW GUIDANCE CONCENTRATION.

PRIVATE WELLS. VINYLCHLORIDE CONCENTRATION >1ug/L.

— — — 20" POTABLE WATER LINE.

— — — 12" POTABLE WATER LINE.

— — — 8" POTABLE WATER LINE.

— — — 6" POTABLE WATER LINE.

— — — 4" POTABLE WATER LINE.

PW RESIDENCE IS CONNECTED TO PUBLIC WATER.

SOLITRON MICROWAVE SITE
PORT SALERNO, MARTIN COUNTY, FLORIDA

MONITOR WELL LOCATIONS

ROY F. WESTON, INC.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

DRAWN:

DATE:

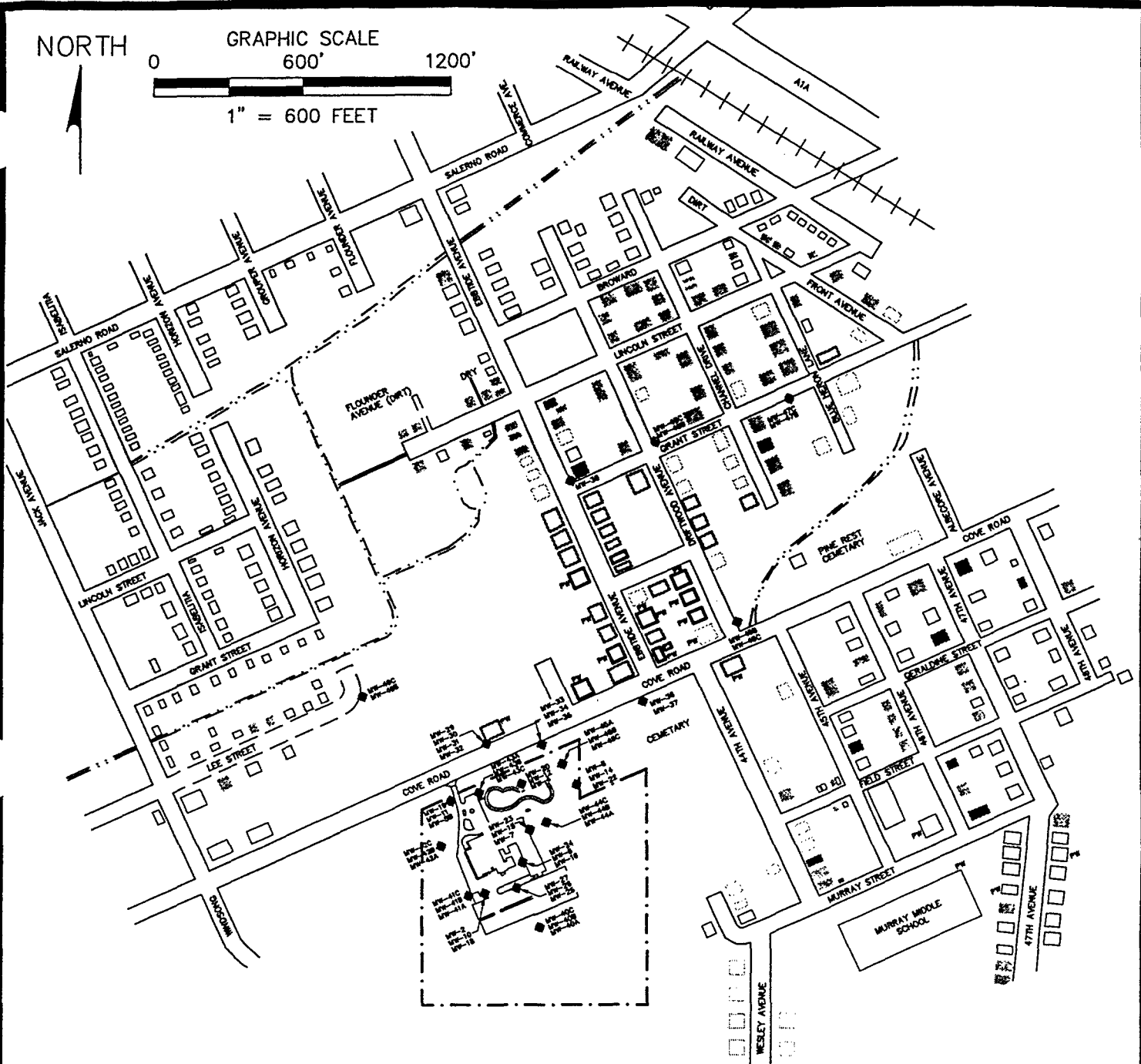
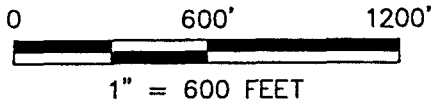
W.O. NO.:

NAME: 8511SOL2.dwg

DRAWING

NORTH

GRAPHIC SCALE



GENERAL LEGEND:

- . . — PROPERTY LINE.
- . . — WATER
- — — EXISTING PAVED ROADS.
- - - EXISTING DIRT ROADS.
- + + + RAILROAD TRACKS.
- MW-38 EXISTING MONITORING WELL LOCATION.

SAMPLED JUNE 1999

- PRIVATE WELLS. SAMPLED, NO CONSTITUENTS OF CONCERN DETECTED.
- PRIVATE WELLS. 1,1-DCE, 1,2-DCE, TCE, PCE, AND/OR VINYLCHLORIDE DETECTED BELOW GUIDANCE CONCENTRATION.
- PW RESIDENCE IS CONNECTED TO PUBLIC WATER.

SAMPLED PRIOR TO JUNE 1999

- SAMPLED PREVIOUSLY, NO CONSTITUENT OF CONCERN DETECTED.
- SAMPLED PREVIOUSLY 1,1-DCE, 1,2-DCE, TCE, PCE, AND/OR VINYLCHLORIDE DETECTED BELOW GUIDANCE CONCENTRATION.
- SAMPLED PREVIOUSLY VINYLCHLORIDE CONCENTRATION >1ug/L.
- NEVER SAMPLED.

SOLITRON MICROWAVE SITE
PORT SALERNO, MARTIN COUNTY, FLORIDA

MARTIN COUNTY HEALTH DEPARTMENT
PRIVATE WELL SAMPLING RESULTS
JUNE 1999

ROY F. WESTON, INC.



DRAWN:

DATE:

W.O. NO.:

NAME: 8511SOL3.dwg

DRAWING

3.0 COMMUNITY PARTICIPATION

To follow is a summary of the major community relations activities conducted by EPA at the Solitron Site.

- C EPA conducted community interviews during March 1999 and finalized the Community Relations Plan in May 1999.
- C EPA issued fact sheets about site activities in January 1998, February 1999, and July 2000.
- C The Proposed Plan was advertised in the Stuart News on July 6, 2000. The 30-day comment period was held from July 12, 2000 until August 11, 2000. The Proposed Plan public meeting was held on July 20 at the Murray Middle School in Port Salerno.
- C The administrative record was placed both in the information repository at the Blake Library, Martin County Library System, 2351 SE Monterey Avenue, Stuart, FL and in the U.S. EPA's record center at 61 Forsyth St., Atlanta, GA.

4.0 SCOPE AND ROLE OF ACTION

In 1989, the Potentially Responsible Party (PRP) removed 260 cubic yards of metals-contaminated sediment from the percolation pond and remediated contaminated sediment from the waste water pond. This final action will address the volatile organic compounds (VOCs) associated with the Site in both soil and groundwater. As a result, the action will not be separated into operable units. The selected remedy has several components such as the connection of homes to the county water system, active groundwater treatment, and the excavation of soil.

To follow is the overall site cleanup plan:

- C Public water lines will be extended to homes located north and east of the Site within a distance of about 3/8 mile from the Site. The connection of homes to water lines will be the first priority in the remedial design and remedial action, though it is likely that the other components can be addressed concurrently.
- C The principal threat at the Site, approximately 330 cubic yards of soil above the cleanup goal, will be excavated from a small area near the south side of the building and replaced with clean fill. This action is being taken to ensure that contaminants do not continue to leach into the groundwater. The excavated soil will be sent off-site for disposal
- C In-Situ Chemical Oxidation will be used to treat the highest levels of groundwater contamination which are found on-site and just north of the Site. After the short term cleanup goals have been met, the groundwater will be monitored to ensure that the contaminants naturally degrade to the long term cleanup goals.
- C Institutional controls in the form of deed notices will be used to ensure the contaminated groundwater on the Site is not used for drinking purposes until the cleanup standards are met and to ensure that soil underneath existing buildings is sampled and treated, as appropriate, if the buildings are disturbed in the future. Additionally, the EPA has notified the appropriate county, state, or water management district offices of the groundwater contamination. These agencies should provide notification to the residents in the area of the potential contamination prior to installing a well.

5.0 SITE CHARACTERISTICS

5.1 Site Area

The Site property comprises almost 20 acres, approximately eight of which were used for business purposes. Existing on-site features include the main Solitron plant building, a storage shed (former hazardous waste storage building), parking lots, a percolation pond (less than ½ acre), and two septic fields (located east and west of the plant building). Concrete sumps are present at ground level near the former IWTP; one sump is present on the west side of the main building.

The remaining 12 acres, not associated with site operations, are covered with trees and small brush common to south Florida, such as slash pine and palmetto. There are apparent wetland areas on the northwest and northeast corners of the Site, but the wetlands are not delineated on the national wetland inventory maps. More wetlands were present during the late 1950's prior to construction on the Site.

During a site visit, the U.S. Fish and Wildlife Service noted the presence of a gopher tortoise burrow on the Site. The burrow could potentially be used by the eastern indigo snake, a species that is considered threatened. The snake was not actually observed at the Site, but the habitat is suitable for the snake.

Surface runoff from the Site flows toward Cove Road and is collected in drainage basins via stormwater drains along Cove Road. The runoff is carried from the drainage basins eastward approximately 0.28 miles through roadside ditches into an unnamed tributary of the Manatee Pocket. The tributary drains to the Manatee Pocket approximately 0.52 miles north. The Manatee Pocket flows northward 1.2 miles to its confluence with the St. Lucie River, which flows westward 2.27 miles to the Atlantic Ocean.

5.2 Geology and Hydrogeology

The Site is directly underlain by the Pamlico Sands and the Anastasia Formation. The Pamlico Sand is described as loose, unconsolidated quartz sand occurring as a thin veneer and as dune ridges. The Anastasia Formation is described as loose to sub-lithic quartz sand and interbedded with carbonate layers consisting of shell fragments having a calcite cement. The Pamlico Sand and the Anastasia Formation are post Miocene in age, and comprise the shallow aquifer. The Anastasia Formation is underlain by the Miocene Hawthorn Group, which functions as a confining layer; and the Oligocene Suwanee Limestone and Eocene Ocala Group and Avon Park Limestone, which together comprise the Floridan aquifer.

A generalized stratigraphic column showing the subsurface geology at the site is shown on Figure 5-1. This column was developed from soil data collected during the remedial

STRATIGRAPHIC UNITS

LITHOLOGIC UNITS

PAMLICO SANDS
(UNCONSOLIDATED)

ANASTASIA
FORMATION

HAWTHORN GROUP

LAND
SURFACE

8 ft BGS

30 ft BGS

70 ft BGS

150 ft BGS

180 ft BGS

200 ft BGS

210 ft BGS

HARDPAN

SANDY SILTS /
SILTY SANDS

SANDY SILT /
SILTY SAND
WITH SHELLS

CLAY LENSES

INTERBEDDED SAND,
SHELL AND LIMESTONE
GRAVEL LAYERS

SAND AND SILTY
SAND LAYERS

SAND TO SILTY SAND
WITH SOME CLAY POCKETS

CLAYEY SAND
OLIVE SANDY CLAY



GENERALIZED
STRATIGRAPHIC
COLUMN

SOLITRON MICROWAVE SITE
PORT SALERNO, MARTIN COUNTY, FLORIDA

investigation. Unconsolidated silty sands and sandy silts are present to approximately 30 ft below ground surface (bgs). A laterally continuous hardpan layer was observed at all sampling locations at depths varying from 4 to 8 ft bgs. This hardpan is typically a 4 to 6-inch thick layer of dark brown to black, organic rich, cemented sand. The water table was generally observed slightly below this hardpan layer.

At approximately 30 ft bgs, a distinct change in lithology is observed. The sandy silts and silty sands become more consolidated/cemented, and shells and shell fragments become mixed with the silt/sand grains. This change in lithology was used to define the base of the shallow water bearing unit (WBU). The existing wells screened in this interval were generally screened from 5 to 30 ft bgs. Newly installed monitor wells were screened in the unconsolidated sands (at the soil/water interface), and immediately above the more consolidated shelly sands and silts of the shallow WBU.

Below 30 ft, sandy silt and silty sand layers with shells are observed to a depth of approximately 70 ft bgs. At approximately 70 to 75 ft bgs on-site, and 50 to 60 ft bgs oil site to the north and northeast, clay layers of 1-inch thickness and greater are observed. The clay layers do not appear to be laterally continuous, and the thickness and quality of the clay varies across the Site (e.g., from sandy silty clay observed in borehole MW-40D to stiff plastic clay observed in borehole MW-46C). Because the clay layers may affect vertical groundwater flow, this change in lithology was used to indicate the base of the intermediate WBU. Previously installed monitor wells were generally screened from 50 to 75 ft bgs to screen the intermediate WBU. The newly installed monitor wells were installed immediately above the first significant occurrence of clay, generally from approximately 70 to 75 ft bgs.

Below 75 feet, interbedded sand, shell and limestone gravel layers are observed. The shell layers decrease below 150 feet, and below 180 feet, clay pockets are observed. The sands and silts become olive-gray, with clay content gradually increasing below 210 feet. These olive-gray soils are indicative of the top of the Hawthorn Group that acts as a confining unit to the surficial aquifer in the Site area. Existing monitor wells monitoring the deep WBU were generally screened from 75 to 100 ft bgs. The two deepest previously installed wells at the Solitron Microwave Site were screened from approximately 126 to 151 ft bgs and 120 to 145 ft bgs. No newly installed monitor wells were screened in the deep WBU.

No laterally continuous confining layer was identified at any of the borings or newly installed monitor well cluster locations to a depth of approximately 210 ft bgs.

The direction of groundwater flow is generally to the northeast from the Site. The hydraulic gradient was measured to be approximately 0.002 ft/ft in the shallow, intermediate, and deep portions of the aquifer. The hydraulic conductivity was estimated to be 71.4 ft²/day, based on available literature.

5.3 Nature and Extent of Contamination

During the remedial investigation, samples of soil, sediment, and groundwater were collected on the Site and from nearby areas. The soil sampling was focused around the buildings where Site activities are known to have occurred. Sediment and surface water samples were collected from the only on-site surface water body, the former percolation pond. Groundwater samples were collected from across the northern third of the Site and downgradient from the Site.

The RI was conducted in two phases. The fieldwork for Phase I was conducted during January 1998 and included the collection of:

- C sixteen groundwater samples from existing site monitor wells which were analyzed for VOCs, metals, and cyanide analyses to confirm existing data;
- C eleven groundwater samples from previously drilled well locations where wells were either damaged or could not be located using Direct Penetration Technology (DPT);
- C three surface water samples from on-site tanks which were analyzed for VOCs;
- C five soil samples from the industrial waste treatment system (IWTP) area and ten soil samples from the septic fields east and west of the Solitron building to evaluate potential source areas;
- C water level measurements from existing monitor wells to evaluate hydraulic gradient and the direction of groundwater flow;
- C ten shallow groundwater samples in potential source areas (i.e., septic fields east and west of the Solitron Microwave building) which were analyzed for VOCs, metals, and cyanide; and
- C three surface water and three sediment samples from the on-site percolation pond which were analyzed for VOCs, metals and cyanide.

Field activities for the Phase II Site Characterization were conducted from February 2, 1999 through April 18, 1999, and included the following:

- C Collection and evaluation of geologic data from 22 on-site and 8 off-site soil borings;
- C Collection of soil samples from 19 soil borings for VOC analyses;

- C Collection of water samples from three on-site concrete tanks/vaults for VOC analysis;
- C Use of Direct Penetration Technology (DPT) to collect 22 groundwater samples at proposed locations for permanent monitor wells for VOC analysis;
- C Installation of 26 monitor wells located in six on-site and four off-site well clusters and collection of groundwater samples for VOC analysis;
- C Collection of groundwater samples from 27 existing monitor wells both on- and off-site.

Based on the results of the remedial investigation, contaminants of potential concern (COPCs) were identified (Tables 5-1 through 5-6). COPCs are chemicals that were found at concentrations which exceeded initial screening values and may or may not require a remedial action. A Baseline Risk Assessment was conducted which evaluated the COPCs to determine which chemicals were present at levels that posed an unacceptable risk to human health. These chemicals are called contaminants of concern (COCs) and are listed in Chapter 7, Tables 7-1 through 7-5.

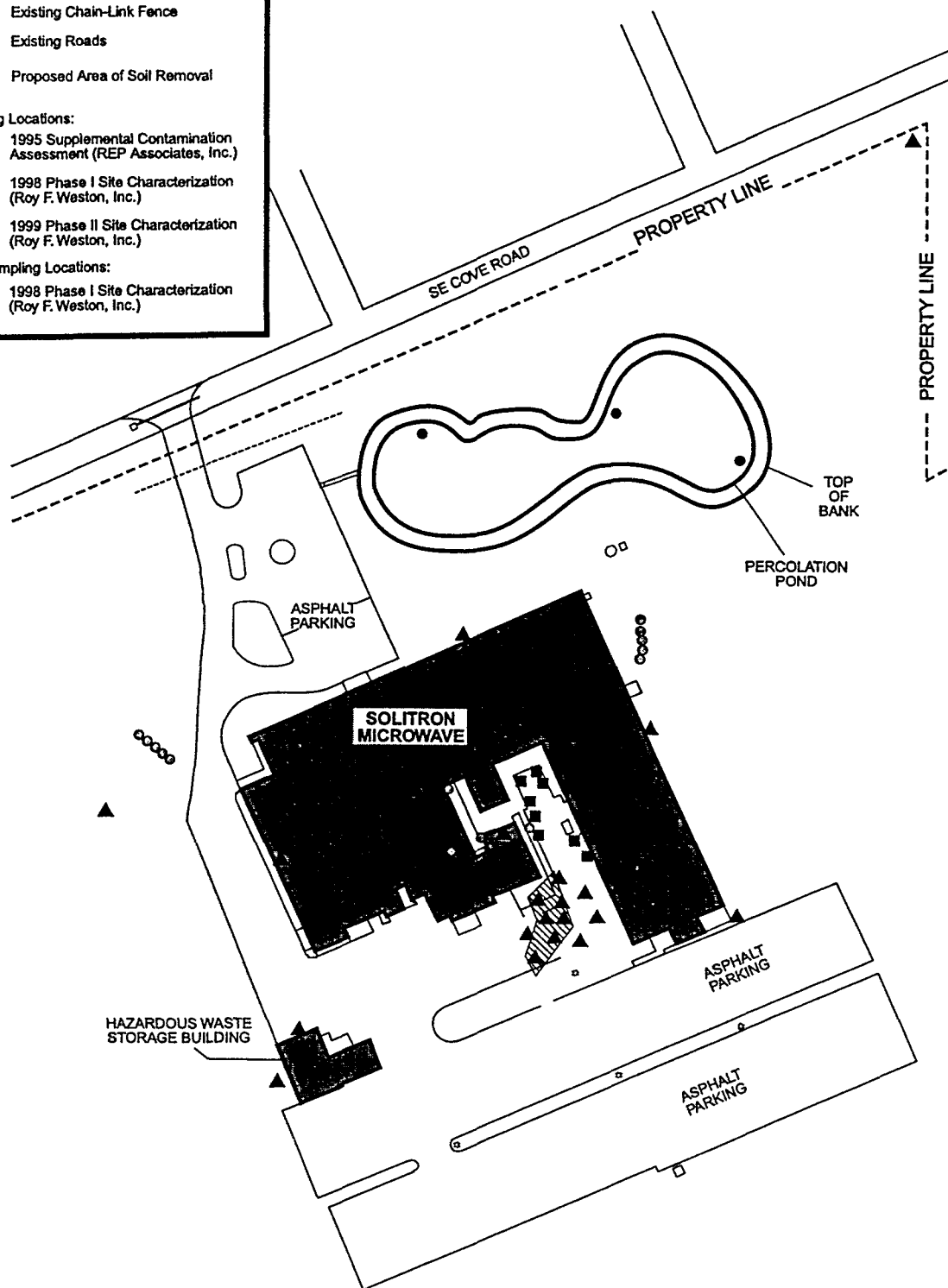
A small area of VOC contaminated soil was found near the south side of the building, generally south of the former IWTP and the parking lot. The total estimated volume of contaminated soil is approximately 330 cubic yards. The contamination extends down about 5 feet below the surface. The soil could be a potential source of groundwater contamination. The soil sampling locations along with the area to be excavated is shown on Figure 5-2.

VOC's were found in the groundwater under the plant buildings and extend downgradient about 3/8 mile to the north and east of the Site. The highest levels of contaminants are generally found in the shallow groundwater (5 to 30 feet bls) at the Site, though the highest concentrations of vinyl chloride were found at about 70 feet below the surface. The extent of downgradient contamination is based upon the presence of site related contaminants in some private wells north and east of the Site. The contamination is generally found off-site at depths estimated to be greater than approximately 60 feet. Shallow and intermediate depth wells installed by EPA downgradient of the Site did not exhibit VOC contamination, except for one detection of acetone in well 47B. The extent of groundwater contamination based on the results of both private well and monitoring well sampling is shown on Figure 5-3.

VOCs were not detected in surface water or sediment from the on-site pond. Metals were detected in sediment and surface water.

EXPLANATION

- Property Line
 - Existing Chain-Link Fence
 - Existing Roads
 - ▨ Proposed Area of Soil Removal
- Soil Sampling Locations:**
- 1995 Supplemental Contamination Assessment (REP Associates, Inc.)
 - 1998 Phase I Site Characterization (Roy F. Weston, Inc.)
 - ▲ 1999 Phase II Site Characterization (Roy F. Weston, Inc.)
- Sediment Sampling Locations:**
- 1998 Phase I Site Characterization (Roy F. Weston, Inc.)



SOLITRON MICROWAVE SITE
PORT SALERNO,
MARTIN COUNTY, FLORIDA

SOIL AND SEDIMENT SAMPLING LOCATIONS
AND PROPOSED AREA OF SOIL REMOVAL

FIGURE 5.0



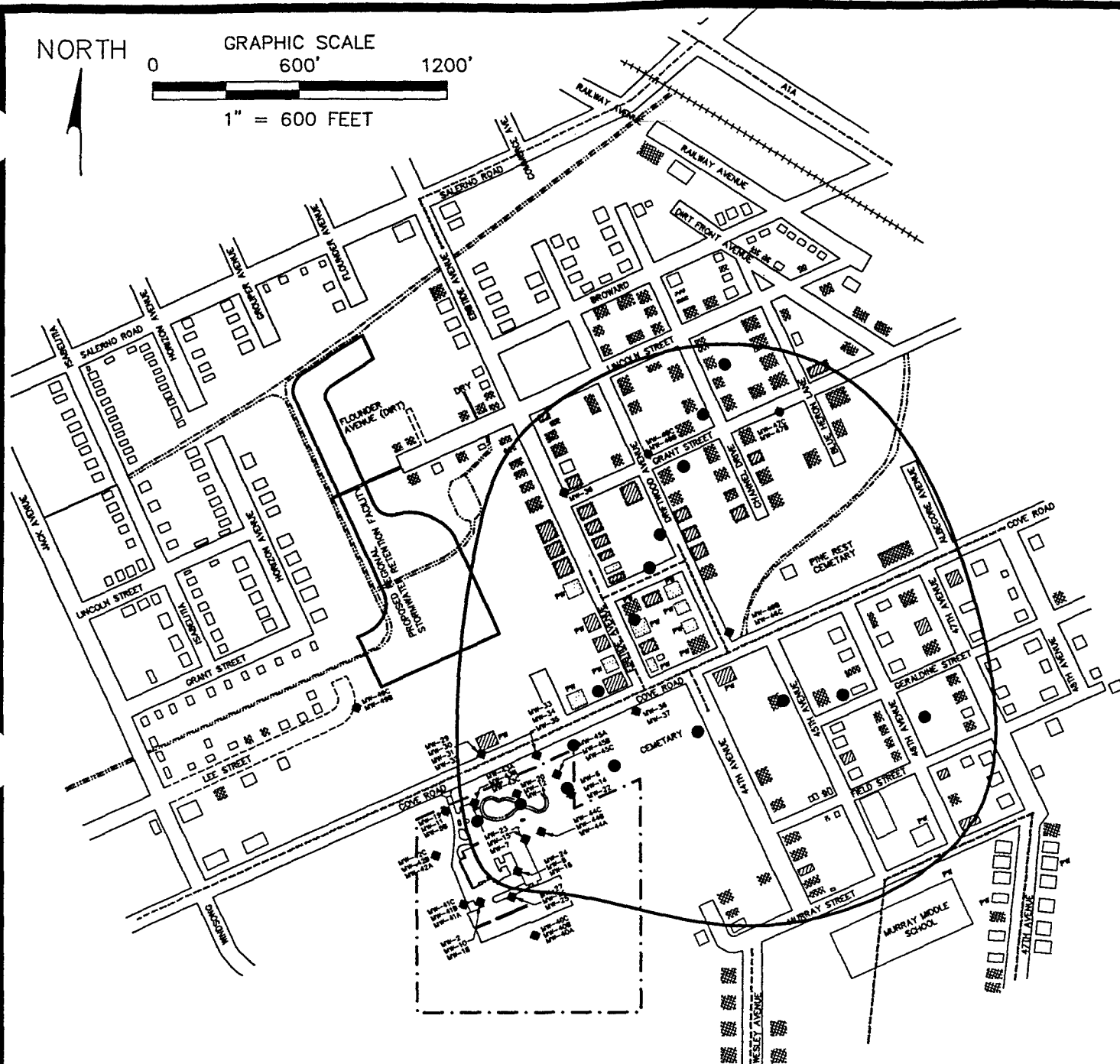
DRAWN BY: E. CRISP	DATE: 20 DEC 99	W.O. #: 20064-039-100
CHECKED BY:	DATE:	FILE NAME:

NORTH

GRAPHIC SCALE

0 600' 1200'

1" = 600 FEET



GENERAL LEGEND:

— PROPERTY LINE.

— WATER

— EXISTING PAVED ROADS.

- - - EXISTING DIRT ROADS.

+ + + + + RAILROAD TRACKS.

MW-38 ● EXISTING MONITORING WELL LOCATION.

■ PRIVATE WELLS. SAMPLED, NO CONSTITUENTS OF CONCERN DETECTED.

■ PRIVATE WELLS.
1,1-DCE, 1,1-DCA, 1,2-DCE, TCE, PCE,
AND/OR VINYLCHLORIDE DETECTED BELOW
GUIDANCE CONCENTRATION.

■ PRIVATE WELLS.
VINYLCHLORIDE CONCENTRATION >1ug/L.

— 20" POTABLE WATER LINE.

- - - 12" POTABLE WATER LINE.

- - - 8" POTABLE WATER LINE.

— 6" POTABLE WATER LINE.

- - - 4" POTABLE WATER LINE.

PW RESIDENCE IS CONNECTED TO PUBLIC WATER.

— ESTIMATED LIMIT OF CONTAMINATED GROUNDWATER PLUME.

● PROPOSED IN-WELL VAPOR EXTRACTION LOCATIONS.

SOLITRON MICROWAVE SITE
PORT SALERNO, MARTIN COUNTY, FLORIDA

ESTIMATED EXTENT OF
GROUNDWATER CONTAMINATION

ROY F. WESTON, INC.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

DRAWN:

DATE:

I.W.O. NO.:

TABLE 5-1 CONTAMINANTS OF POTENTIAL CONCERN IN SURFACE SOIL (0 to 2.5 feet deep)		
CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS (mg/kg)
cis-1,2-dichloroethene	4/11	0.040 - 6.7
tetrachloroethene	4/21	0.005 - 35
trichloroethane	4/21	0.001 - 7.2
Chromium	12/16	0.23 - 83
Copper	10/10	2.5 - 1300
Mercury	1/8	1.6

TABLE 5-2
CONTAMINANTS OF POTENTIAL CONCERN IN ON-SITE
SHALLOW GROUNDWATER
(5-30 FEET DEEP)

CONTAMINANT	FREQUENCY OF DETECTION (in monitoring well or DPT samples)	RANGE OF DETECTED CONCENTRATIONS (ug/l)
1,1-dichloroethane	37/57	0.62 - 910
1,1-dichloroethene	26/57	0.53 - 340
1,2,4-Trimethylbenzene	4/38	0.56 - 11
acetone	5/57	26 - 3200
chloroethane	5/57	1 - 11
chloroform	3/57	1 - 3
cis-1,2-dichloroethene	24/40	0.77 - 3900
tetrachloroethene	23/57	0.61 - 1300
trans-1,2-dichloroethene	14/40	1 - 51
trichloroethene	24/57	0.52 - 4100
vinyl chloride	28/57	1 - 1800
naphthalene	3/36	1 - 2.2
aluminum	17/18	0.17 - 10*
arsenic	4/30	0.0027 - 0.019*
cadmium	3/30	0.001 - 0.011
chromium	16/30	0.003 - 0.032*
copper	6/18	0.01 - 2.2*
manganese	14/18	0.004 - 1.2*
molybdenum	4/12	0.01 - 0.022*
nickel	5/18	0.005 - 1.1*
silver	1/30	0.048*
yttrium	6/12	0.0019 - 0.005*
* metals values are listed in mg/l		

TABLE 5-3
CONTAMINANTS OF POTENTIAL CONCERN IN ON-SITE
INTERMEDIATE GROUNDWATER
(30-70 FEET DEEP)

CONTAMINANT	FREQUENCY OF DETECTION (in monitoring well)	RANGE OF DETECTED CONCENTRATIONS (ug/l)
1,1-dichloroethane	8/27	1 - 490
1,1-dichloroethene	2/27	16 - 170
1,2,-dichloroethene (total)	2/10	2 - 5000
acetone	2/27	220 - 250
chloroethane	1/27	4.2
Chloroform	1/27	1.8
cis-1,2-dichloroethene	4/17	1.2 - 260
tetrachloroethene	2/27	2.2 - 3.3
vinyl chloride	7/27	0.79 - 2800
arsenic	2/20	0.0012 - 0.0025*
cadmium	1/20	0.002*
chromium	7/20	0.002 - 0.014*
manganese	11/12	0.0060 - 0.5*
* metals values are listed in mg/l		

TABLE 5-4
CONTAMINANTS OF POTENTIAL CONCERN IN ON-SITE
DEEP GROUNDWATER
(70-145 FEET DEEP)

CONTAMINANT	FREQUENCY OF DETECTION (in monitoring well)	RANGE OF DETECTED CONCENTRATIONS (ug/l)
1,1-dichloroethane	3/14	2 - 110
cis-1,2-dichloroethene	1/6	25
chloroethane	1/14	5.9
vinyl chloride	3/14	3 - 110
aluminum	2/4	0.08 - 7.1*
arsenic	1/10	0.024*
cadmium	1/10	0.006*
chromium	3/10	0.003 - 0.12*
manganese	4/4	0.011 - 0.18*
* metals values are listed in mg/l		

TABLE 5-5
CONTAMINANTS OF POTENTIAL CONCERN IN POND SEDIMENT*

CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS (mg/kg)
VOCs	not detected	
cadmium	2/3	1.9 - 5.2
copper	3/3	12 - 240
nickel	3/3	23 - 340
silver	3/3	0.93 - 14
*Not a problem for human health, but potential concern for the environment. Water coverage of pond sediment makes human exposure to the pond sediment unlikely.		

TABLE 5-6 CONTAMINANTS OF POTENTIAL CONCERN IN SURFACE WATER FROM ON-SITE POND*		
CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS (ug/l)
chromium	3/3	9 - 27
copper	3/3	35 - 36
<i>* Not a problem for human health, but potential concern for the environment. No COPCs for human exposure were found following human health COPC screening.</i>		

The significant components of the conceptual site model include:

- C VOCs are present in soil at levels which may be released to groundwater;
- C VOCs are present in groundwater may be consumed by people; and
- C metals in sediment from the on-site pond may bioaccumulate up the foodchain to birds and animals.

6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Uses

The Site is currently not in use, but is for sale. The property is zoned for industrial use. Residential properties are located on all sides of the Site. Potential developers have suggested a variety of uses ranging from industrial to residential or a residential/commercial mix.

Groundwater Uses

Groundwater is present in three water bearing units of the surficial aquifer and generally flows in a northeast direction. Groundwater in the surrounding area is used for drinking water as evidenced by the private drinking water wells in use near the Site. The private wells are estimated to be at least 50 feet deep. Even though water line extensions will be offered as part of the remedy, it is expected that not all residents will connect. Therefore, groundwater in the area is likely to continue to be used for drinking in the future.

7.0 SUMMARY OF SITE RISKS

CERCLA directs EPA to conduct a baseline risk assessment to determine whether a Superfund Site poses a current or potential threat to human health and the environment in the absence of any remedial action. The baseline risk assessment provides the basis for taking action and indicates the exposure pathways that need to be addressed by the remedial action. This section of the ROD reports the results of the baseline risk assessment conducted for this Site.

7.1 Contaminants of Concern

The chemicals measured in the various environmental media during the RI are included in this discussion of the site risks, if the results of the risk assessment indicated that a contaminant might pose a significant current or future risk or contribute to a cumulative risk which is significant. EPA also considered past disposal practices, frequency of detection, and toxicity of contaminants to identify the contaminants of concern. The contaminants of concern (COCs) as listed in Tables 7-1 through 7-5 and are a subset of the contaminants of potential concern (COPCs) listed in Tables 5-1 through 5-5. The following criteria were used for determining COCs from the list of COPCs:

- 1) they exceed the risk based criteria in the baseline risk assessment (i.e., above the acceptable risk range, 1×10^{-4} to 1×10^{-6} , or a hazard quotient (HQ) greater than 1.0 (unity);
- 2) they are projected to have the potential to leach to groundwater at levels exceeding a Maximum Contaminant Level (MCL); or
- 3) because the contaminant concentration in a given medium exceeds a Federal or State chemical-specific Applicable or Relevant and Appropriate Requirement (ARAR).

Some of the COPCs did not qualify as contaminants of concern and the rationale is as follows: chromium, copper, mercury in soil were not considered contaminants of concern because their respective HQs (for the most conservative exposure scenario - child resident) were less than 1.0. VOCs in soil do not pose an unacceptable risk, but are retained as contaminants of concern because of the potential for the VOCs to impact groundwater. Aluminum, arsenic, cadmium, chromium, copper, molybdenum, nickel, silver, and yttrium in groundwater did not contribute to a carcinogenic risk level above the acceptable risk range, i.e., 1×10^{-4} to 1×10^{-6} , or a hazard quotient (HQ) greater than 1.0 and were therefore not retained as contaminants of concern. Metals in sediment and surface water from the on-site pond are not considered contaminants of concern because there is no completed human exposure pathway. However, the metals in sediment are retained because of the potential risk to ecological receptors such as wading birds which have been seen in the pond.

TABLE 7-1
CONTAMINANTS OF CONCERN IN SURFACE SOIL
(0 to 2.5 feet deep)

CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION (mg/kg)	AVERAGE CONCENTRATION (mg/kg)	CLEANUP GOAL (mg/kg)
cis-1,2-dichloroethene	4/11	0.04 - 6.7	0.67	0.4
tetrachloroethene	4/21	0.005 - 35	2.0	0.03
Trichloroethene	4/21	0.001 - 7.2	0.55	0.03

Cleanup goals are based on prevention of contaminant leaching from soil to groundwater. See Section 8.0 for information on how these cleanup goals are developed.

TABLE 7-2
CONTAMINANTS* OF CONCERN IN ON-SITE SHALLOW GROUNDWATER
(5-30 FEET DEEP)

CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS (ug/l)	AVERAGE CONCENTRATION (ug/l)	NADC** (ug/l)	CLEANUP GOAL (ug/l)
1,1-dichloroethane	37/57	0.62 - 910	64	700	NS
1,1-dichloroethene	26/57	0.53 - 340	21	700	7
acetone	5/57	26 - 3200	95	7000	NS
cis-1,2-dichloroethene	24/38	0.77 - 3900	364	700	70
tetrachloroethene	23/57	0.61 - 1300	53	300	3
trans-1,2-dichloroethene	14/38	1 - 51	7	1000	100
trichloroethene	24/57	0.52 - 4100	107	300	3
vinyl chloride	28/57	1 - 1800	105	100	1
manganese	14/18	4 - 1200	200	500	NS

* VOCs from monitoring wells or DPT samples; metals from monitoring wells only

** NADC: Florida's Natural Attenuation Default Criteria (there is no primary drinking water standard for manganese; the secondary standard, based on aesthetic considerations is 50 ug/l). For more information on how the NADC's were used in developing the cleanup goals, see Section 8.0.

NS =No Standard

TABLE 7-3
CONTAMINANTS OF CONCERN IN ON-SITE INTERMEDIATE GROUNDWATER
(30 -70 FEET DEEP)

CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS (ug/l)	AVERAGE CONCENTRATION (ug/l)	NADC** (ug/l)	CLEANUP GOAL (ug/l)
1,1-dichloroethane	8/27	1 - 490	31	700	NS
1,1-dichloroethene	2/27	16 - 170	9	700	7
cis-1,2-dichloroethene	4/17	1.2 - 260	18	700	70
tetrachloroethene	2/27	2.2 - 3.3	9.7 ¹	300	3
vinyl chloride	7/27	0.79 - 2800	139	100	1
manganese	11/12	6 - 500	106	500	NS
<p>* VOCs from monitoring wells or DPT samples; metals from monitoring wells only.</p> <p>** NADC: Florida's Natural Attenuation Default Criteria (The average concentration is elevated because the detection limits were elevated for some of these samples.) For more information on how the NADC's were used in developing the cleanup goals, see Section 8.0.</p> <p>NS=No Standard</p>					

TABLE 7-4
CONTAMINANTS OF CONCERN IN ON-SITE DEEP GROUNDWATER
(70-145 FEET DEEP)

CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATIONS (ug/l)	AVERAGE CONCENTRATION (ug/l)	NADC** (ug/l)	CLEANUP GOAL (ug/l)
1,1-dichloroethane	3/14	2 - 110	10	700	NS
vinyl chloride	3/14	3 - 110	11	100	1
manganese	4/4	11 - 180	65	500	NS
<p>* VOCs from monitoring wells or DPT samples; metals from monitoring wells only.</p> <p>** NADC: Florida's Natural Attenuation Default Criteria. For more information on how the NADC's were used in developing the cleanup goals, see Section 8.0.</p> <p>NS = No Standard</p>					

TABLE 7-5
CONTAMINANTS OF CONCERN IN SURFACE SOIL

CONTAMINANT	FREQUENCY OF DETECTION	RANGE OF DETECTED CONCENTRATION (mg/kg)	AVERAGE VALUE (mg/kg)	SCREENING VALUE (mg/kg)
VOCs	not detected			
cadmium	2/3	1.9 - 5.2	2.7	1
copper	3/3	12 - 240	101	18.7
nickel	3/3	23 - 340	168	15.9
silver	3/3	0.93 - 14	5.9	2
<i>The EPA Region 4 screening values for sediment were used. These screening values are not cleanup goals; they just suggest the need for further evaluation.</i>				

7.2 Exposure Assessment

Whether a chemical is actually a concern to human health and the environment depends upon the likelihood of exposure (i.e. whether the exposure pathway is currently complete or could be complete in the future). A complete exposure pathway (a sequence of events leading to contact with a chemical) is defined by the following four elements:

- C a source and mechanism of release from the source,
- C a transport medium (e.g., surface water, air) and mechanisms of migration through the medium,
- C the presence or potential presence of a receptor at the exposure point, and
- C a route of exposure (ingestion, inhalation, dermal absorption).

An evaluation was undertaken of all potential exposure pathways (Table 7-6) which could connect chemical sources at the Site with potential receptors. All possible pathways were first hypothesized and evaluated for completeness using the above criteria. The current pathways represent exposure pathways which could exist under current Site conditions while the future pathways represent exposure pathways which could exist, in the future, if the current exposure conditions change. Exposure by each of these pathways was mathematically modeled using generally conservative assumptions. Residential exposures were evaluated in the Baseline Risk Assessment (BRA).

TABLE 7-6 POTENTIAL EXPOSURE PATHWAYS			
MEDIA	SCENARIO TIME FRAME	RECEPTOR	EXPOSURE PATHWAYS
On-Site Surface Soil	Current	Teenage Trespasser	Ingestion, Inhalation & Dermal Contact*
	Future	Resident, Industrial & Construction Worker	Ingestion, Inhalation & Dermal Contact
On-Site Subsurface Soil	Future	Adult Construction Worker	Ingestion, Inhalation & Dermal Contact
On-Site Surface Water (Pond)	Current	Trespasser	Dermal Contact
	Future	Residential & Industrial Worker	Dermal Contact
On-Site Groundwater	Future	Resident	Ingestion, Inhalation & Dermal Contact
		Industrial Worker	Ingestion
* Current 7 to 16 year old trespassers, future residents, and future industrial workers were assumed to be exposed to surface soil. However, surface and subsurface soil results were used to evaluate inhalation of volatiles from on-site soil.			

The exposure point concentrations (EPCs) for each of the chemicals of concern and the exposure assumptions for each pathway with an unacceptable risk or hazard were used to estimate the chronic daily intakes for the potentially complete pathways (the exposure assumptions for the pathways of concern are found in Appendix A). The EPCs are summarized in Tables 7-7 through 7-11 for those contaminants and exposure pathways that were found to present a significant potential risk. The baseline risk assessment is based on the reasonable maximum exposure (RME) that may be encountered during the various Site use scenarios. The RME concentrations for soil are either the calculated 95% Upper Confidence Limit of the arithmetic mean or the maximum concentration detected during sampling. Exposure point concentrations in groundwater are the mean chemical concentration in those wells that represent the center of the plume or the most highly contaminated portion of the plume. The intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures. If the calculated UCL exceeds the maximum level measured at the Site, then the maximum concentration detected was used to represent the reasonable maximum concentration. The chronic daily intakes were then used in conjunction with cancer slope factors and noncarcinogenic reference doses to evaluate risk.

TABLE 7-7 EXPOSURE POINT CONCENTRATIONS IN SURFACE SOIL		
CONTAMINANT	EPC Value (mg/kg)	Max. or 95% UCL
cis-1,2-dichloroethene	6.7	max
tetrachloroethene	35	max
trichloroethene	7.2	max

TABLE 7-8 EXPOSURE POINT CONCENTRATIONS IN SOIL (0-8 ft bgs) (Construction worker scenario)		
CONTAMINANT	EPC Value (mg/kg)	Max. or 95% UCL
cis-1,2-dichloroethene	6.7	max
tetrachloroethene	6.6	95% UCL
trichloroethene	7.2	max

TABLE 7-9 EXPOSURE POINT CONCENTRATIONS IN SHALLOW GROUNDWATER	
CONTAMINANT	EPC Value (ug/l)
1,1-dichloroethane	582
1,1-dichloroethene	265
acetone	2250
cis-1,2-dichloroethene	2800
tetrachloroethene	853
trichloroethene	1322
vinyl chloride	1237
manganese	1000
<i>Exposure point concentrations in groundwater are the mean chemical concentration in those wells that represent the center of the plume or the most highly contaminated portion of the plume. Thus, the mean values presented here are much higher than the mean or average value calculated from all wells on-site.</i>	

TABLE 7-10 EXPOSURE POINT CONCENTRATIONS IN INTERMEDIATE GROUNDWATER	
CONTAMINANT	EPC Value (ug/l)
1,1-dichloroethane	267
1,1-dichloroethene	93
acetone	235
cis-1,2-dichloroethene	150
tetrachloroethene	2.8
vinyl chloride	1226
manganese	500
<i>Exposure point concentrations in groundwater are the mean chemical concentration in those wells that represent the center of the plume or the most highly contaminated portion of the plume. Thus, the mean values presented here are much higher than the mean or average value calculated from all wells on-site.</i>	

TABLE 7-11 EXPOSURE POINT CONCENTRATIONS IN DEEP GROUNDWATER	
CONTAMINANT	EPC Value (ug/l)
1,1-dichloroethane	38
cis-1,2-dichloroethene	25
vinyl chloride	41
manganese	180
<i>Exposure point concentrations in groundwater are the mean chemical concentration in those wells that represent the center of the plume or the most highly contaminated portion of the plume. Thus, the mean values presented here are much higher than the mean or average value calculated from all wells on-site.</i>	

7.3 Toxicity Assessment

Toxicity values are used in conjunction with the results of the exposure assessment to characterize Site risk. EPA has developed critical toxicity values for carcinogens and noncarcinogens. Cancer slope factors (CSFs) have been developed for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CSFs, which are expressed in units of $(\text{mg/kg/day})^{-1}$, are multiplied by the estimated intake of a potential

carcinogen, in mg/kg/day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term “upper bound” reflects the conservative estimate of the risks calculated from the CSF. Use of this conservative approach makes underestimation of the actual cancer risk highly unlikely. CSFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. Table 7-12 provides carcinogenic risk information which is relevant to the contaminants of concern in both soil and groundwater.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg/day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur. Table 7-13 provides non-carcinogenic risk information which is relevant to the contaminants of concern in both soil and groundwater.

Quantitative dose-response data were compiled from EPA’s Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST), and National Center for Environmental Assessment (NCEA).

Table 7-12 Cancer Toxicity Data Summary						
Pathway: Ingestion, Dermal						
Chemical of Concern	Oral Cancer Slope Factor	Dermal Cancer Slope Factor ⁽¹⁾	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source Target Organ	Date (MM/DD/YYYY)
1,1-dichloroethane	NTV	NTV	(mg/kg/day) ⁻¹	C		1/10/2000
1,1-dichloroethene	0.6	0.6	(mg/kg/day) ⁻¹	C	adrenal pheochromocytomas	1/10/2000
acetone	NC	NC	(mg/kg/day) ⁻¹	D		1/10/2000
cis-1,2-dichloroethene	NC	NC	(mg/kg/day) ⁻¹	D		1/10/2000
tetrachloroethene	0.052	0.052	(mg/kg/day) ⁻¹	Not Classified		10/7/1999

Pathway: Ingestion, Dermal							
trans-1,2-dichloroethene	NTV	NTV	(mg/kg/day) ⁻¹	Not Classified			
trichloroethene	0.011	0.011	(mg/kg/day) ⁻¹	Not Classified		10/7/1999	
vinyl chloride	1.9	1.9	(mg/kg/day) ⁻¹	A	Lung/Liver	7/1/1997	
manganese	NC	NC	(mg/kg/day) ⁻¹	D		1/10/2000	
Pathway: Inhalation							
Chemical of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline	Source	Date
1,1-dichloroethane	NTV		NTV	(mg/kg/day) ⁻¹	C	IRIS	1/10/2000
1,1-dichloroethene	5.00E-05	ug/m ³	1.75E-01	(mg/kg/day) ⁻¹	C	IRIS	1/10/2000
acetone	NC		NC	(mg/kg/day) ⁻¹		IRIS	1/10/2000
cis-1,2-dichloroethene	NC		NC	(mg/kg/day) ⁻¹	D	IRIS	1/10/2000
tetrachloroethene	5.17E-07	ug/m ³	2.00E-03	(mg/kg/day) ⁻¹	Not Classified	NCEA	10/7/1999
trans-1,2-dichloroethene	NTV		NTV	(mg/kg/day) ⁻¹	Not Classified	IRIS	1/10/2000
trichloroethene	1.71E-06	ug/m ³	6.00E-03	(mg/kg/day) ⁻¹	Not Classified	NCEA	10/0/1999
vinyl chloride	8.57E-05	ug/m ³	3.00E-01	(mg/kg/day) ⁻¹	A	HEAST	7/1/1997
manganese	NC		NC	(mg/kg/day) ⁻¹	D		
Key: NTV - Not Available NC - Not classified as a Human Carcinogen A - Human Carcinogen C - Possible Human Carcinogen D - Not Classified as a Human Carcinogen							
<i>(1) Note: At this time, slope factors are not available for the dermal route of exposure. Thus, the dermal slope factors used in the assessment have been extrapolated from oral values. An adjustment factor is sometimes applied, and is dependent upon how well the chemical is absorbed via the oral route. For the adjustment factors used at this site, see the tables in Appendix B.</i>							

Table 7-13
Non-Cancer Toxicity Data Summary

Pathway: Ingestion, Dermal

Chemical of Concern	Chronic/ Sub-chronic	Oral RfD Value	Oral RfD Units	Dermal RfD	Dermal RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ
1,1-dichloroethane	Chronic	1.00E-01	mg/ kg-day	1.00E-01	mg/ kg-day	None Observed	1000/1	HEAST	7/1/1997
1,1-dichloroethene	Chronic	9.00E-03	mg/ kg-day	9.00E-03	mg/ kg-day	Liver Lesions	1000/1	IRIS	1/10/2000
acetone	Chronic	1.00E-01	mg/ kg-day	8.30E-02	mg/ kg-day	Increased liver and kidney weights; kidney toxicity	1000/1	IRIS	1/10/2000
cis-1,2-dichloroethene	Chronic	1.00E-02	mg/ kg-day	1.00E-02	mg/ kg-day	Blood	3000/1	HEAST	7/1/1997
tetrachloroethene	Chronic	1.00E-02	mg/ kg-day	1.00E-02	mg/ kg-day	Hepatotoxicity in Mice/Weight Gain	1000/1	IRIS	1/10/2000
trans-1,2-dichloroethene	Chronic	2.00E-02	mg/ kg-day	2.00E-02	mg/ kg-day	Blood	1000/1	IRIS	1/10/2000
trichloroethene	Chronic	6.00E-03	mg/ kg-day	6.00E-03	mg/ kg-day			NCEA	10/7/1999
vinyl chloride	Chronic	2.00E-02	mg/ kg-day	1.78E-02	mg/ kg-day	Decreased mean terminal body weights in males	3000/1	IRIS	1/10/2000
manganese (food)	Chronic	7.00E-02	mg/ kg-day	4.20E-03	mg/ kg-day	Central Nervous system effects	1/1	IRIS	1/10/2000
manganese (nondiet)	Chronic	2.33E-02	mg/ kg-day	1.4E-03	mg/ kg-day	Central Nervous system effects	1/3	IRIS	1/10/2000
Pathway: Inhalation									
Chemical of Concern	Chronic/ Sub-chronic	Inhalation RfC	RfD Units	Inhalation RfD	RfD Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD: Target Organ	Dates
1,1-dichloroethane	Chronic	4.90E-01	mg/m ³	1.40E-01	mg/ kg-day	Kidney	1000/1	HEAST	7/1/1997

1,1-dichloroethene	Chronic	NTV		NTV					
acetone	Chronic	NTV		NTV					
cis-1,2-dichloroethene	Chronic	NTV		NTV					
tetrachloroethene	Chronic	4.90E-01	mg/m ³	1.40E-01	mg/kg-day			NCEA	10/7/1999
trans-1,2-dichloroethene	Chronic	NTV		NTV					
trichloroethene	Chronic	NTV		NTV					
vinyl chloride	Chronic	NTV		NTV					
manganese (food)	Chronic	NTV		NTV					
manganese (nondiet)	Chronic	5.00E-05	mg/m ³	1.43E-05	mg/kg-day	Impairment of neuro-behavioral function	1000/1	IRIS	1/10/2000
Key: NTV - Not Available NC - Not classified as a Human Carcinogen A - Human Carcinogen C - Possible Human Carcinogen D - Not Classified as a Human Carcinogen									

7.4 Risk Characterization

Human health risks are characterized for potential carcinogenic and noncarcinogenic effects by combining exposure and toxicity information. Excessive lifetime cancer risks are determined by multiplying the estimated daily intake level with the CSF. These risks are probabilities that are generally expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that, as a plausible upper boundary, an individual has a one in one million additional (above their normal risk) chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the assumed specific exposure conditions at a site.

EPA considers individual excess cancer risks in the range of 1×10^{-4} to 1×10^{-6} as protective; however the 1×10^{-6} risk level is generally used as the point of departure for setting cleanup levels at Superfund sites. EPA's definition of acceptable risk is found in 40 CFR 300.430 (e)(2). The point of departure risk level of 1×10^{-6} expresses EPA's preference for remedial actions that result in risks at the more protective end of the risk range. The health-based risk levels for the Site in its current condition are shown in Table 7-14.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminants's reference dose). A HQ which exceeds unity (1) indicates that the daily intake from a scenario exceeds the chemical's reference dose. By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. An HI which exceeds unity indicates that there may be a concern for potential health effects resulting from the cumulative exposure to multiple contaminants within a single medium or across media. The HIs for the Site are shown in Table 7-14.

Using the results of the human exposure assessment and the toxicity information, potential human health risks for each COPC and selected exposure pathway were evaluated. Upper bound excess lifetime cancer risks for carcinogenic chemicals and hazard quotients and hazard index values for noncarcinogenic chemicals were estimated. The upper-bound lifetime excess cancer risks derived in this report can be compared to EPA's target risk range for health protectiveness at Superfund sites of 1×10^{-6} to 1×10^{-4} . In addition, the noncarcinogenic hazard indices can be compared to a value of 1 since hazard indices greater than 1 indicate a potential for adverse health effects.

The risk characterization results showed that the total risk of exposure to shallow, intermediate, and deep groundwater pose unacceptable risks to potential future residents and future adult workers¹. The specific carcinogenic risks are shown on Table 7-14. For example, the carcinogenic risk to future child residents from exposure to shallow, intermediate, and deep groundwater is 1.6×10^{-2} , 1.5×10^{-2} , and 5.6×10^{-4} , respectively. This risk level indicates that if no clean-up action is taken, a child living on the site in the future and consuming shallow or intermediate groundwater would have an increased probability of 2 in 100 of developing cancer as a result of long term ingestion of groundwater contaminated with site-related contaminants. The increased probability of a future child resident developing cancer as a result of long term ingestion of deep groundwater would be 6 in 10,000. Likewise, a future adult resident would have an increased risk of 3 in 100 as a result of long term ingestion of shallow or intermediate groundwater and an increased risk of 1 in 1000 as a result of long term ingestion of deep groundwater. A future adult worker would have an increased risk of 9 in 1000 due to long term ingestion of shallow or intermediate groundwater and an increased risk of 3 in 10,000 due to long term ingestion of deep groundwater.

Therefore, actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

¹ The risk is primarily due to VOC contamination (PCE, TCE, vinyl chloride, etc.). Manganese did contribute to non-cancer risk, but insignificantly (HI = 1.3 to 2.7 approximately).

TABLE 7-14
RISK SUMMARY FOR FUTURE ON-SITE USE

Receptor	Pathway	Noncarcinogenic Risk (Hazard Index)	Carcinogenic Risk
Future Child Resident	Ingestion & inhalation of soil	0.16	5.9×10^{-6}
	Ingestion & inhalation of shallow groundwater	46.5	1.6×10^{-2}
	Ingestion & inhalation of intermediate groundwater	3.9	1.5×10^{-2}
	Ingestion & inhalation of deep groundwater	1.7	5.6×10^{-4}
Future Adult Resident	Ingestion & inhalation of soil	0.037	5.5×10^{-6}
	Ingestion & inhalation of shallow groundwater	19.3	2.8×10^{-2}
	Ingestion & inhalation of intermediate groundwater	1.1	2.6×10^{-2}
	Ingestion & inhalation of deep groundwater	0.73	9.5×10^{-4}
Future Adult Worker	Ingestion of Soil & inhalation of VOCs from soil	0.024	3.8×10^{-6}
	Ingestion & inhalation of shallow groundwater	6.15	9.0×10^{-3}
	Ingestion & inhalation of intermediate groundwater	0.18	8.4×10^{-3}
	Ingestion & inhalation of deep groundwater	0.26	3.1×10^{-4}

7.5 Environmental Risk

A qualitative risk assessment was conducted to determine if contaminants present in site soils, sediment and surface water could potentially impact flora and fauna in the area. However, this risk assessment did not include toxicity testing. Analytical results from the contaminated media were compared with published screening values for ecological effects.

The potential exposure pathways for ecological receptors include ingestion of contaminated soil, ingestion of contaminated sediment from the on-site pond, and ingestion of downgradient surface water potentially contaminated by discharging groundwater.

As for the HHRA, the first step of the ERA was to summarize the analytical data collected during the RI at the Site. Soil, sediment, surface water, and groundwater data were summarized for evaluation in the ERA. COPCs were selected from these media for quantitative evaluation by comparing the maximum detected concentrations of chemicals in these media to EPA Region IV ecologically-based screening level concentrations for surface water and sediment (EPA 1995) or soil screening levels developed by Gary Friday (1998). All compounds detected at concentrations above these screening levels were selected as COPCs and further evaluated in the ERA.

Consistent with current guidance, maximum detected chemical concentrations or maximum quantitative limits were conservatively used to estimate exposure concentrations for ecological receptors.

Results of the ecological exposure assessment and the toxicity data were considered together to determine whether there is the potential for adverse effects to ecological resources. Hazard quotients were significantly elevated assuming exposure to surface soil around the plant building (TCE and PCE had hazard quotients of 7200 and 3500, respectively). Hazard quotients were exceeded for PCE and metals in groundwater from wells installed prior to the RI and from DPT samples from Phase I of the RI. Hazard quotients were also exceeded for PCE and metals in groundwater from new monitoring wells installed as part of Phase II of the RI. However, based upon the Phase II sampling, the hazard quotient for PCE, 14.6, was the only significant elevation. Of the metals, only arsenic and nickel had a hazard quotient greater than 1.0 (1.8 and 1.3, respectively). Groundwater results were compared with saltwater surface water screening values to evaluate the potential risk associated with contaminated groundwater discharging to downstream surface water bodies. Hazard quotients for sediment from the on-site pond were elevated for cadmium, copper, and nickel (5.2, 12.8, and 21.3, respectively).

The U.S Fish and Wildlife Service recently visited the Site and noted the presence of a gopher tortoise burrow. The burrow could potentially be used by the eastern indigo snake, a species that is considered threatened. The snake was not actually observed at the site, but the habitat is suitable for the snake. The standard protection measures for the eastern indigo snake, which will be incorporated into any cleanup actions at the Site, include monitoring, training for site workers, and possible snake relocation. The habitat is in the wooded portion of Site.

7.6 Uncertainties

At all stages of the risk assessment, conservative estimates and assumptions were made so as not to underestimate potential risk. Nevertheless, uncertainties and limitations are inherent in the risk assessment process. To follow are some of the uncertainties associated with the risk assessment.

- The estimates of exposure point concentrations of the chemicals of concern probably overstate actual concentrations to which individuals would hypothetically be exposed and therefore, the health risk estimates are very conservative. In addition, no attenuation of the chemicals was considered; however, this may reduce concentrations of chemicals over time.
- The assumed exposure pathways evaluated in the risk assessment are conservative in nature and may overstate the actual risk posed by this Site.
- Summing risks or hazard indices for multiple contaminants ignores the possibility of synergistic or antagonistic activities in the metabolism of the contaminants.
- The ecological risk assessment did not include toxicity testing (bioassays) for surface water or sediment.
- Groundwater contaminants are generally found at greater depths and decreasing concentrations with increasing distance from the Site. Specifically, the off site contaminants are found at depths of approximately 70 feet or greater. The nearest surface water body, the Manatee Pocket, is about six feet at its deepest point. Therefore, it is unlikely that groundwater contaminants would ever reach the surface waters of Manatee Pocket.
- The elevated hazard quotients associated with ecological exposure to contaminated soil were based upon sampling results from locations adjacent to the building, so actual exposures are not likely to be significant. Additional soil samples were collected from the vegetated portions of the Site during the summer of 2000. Based on this sampling and a review of historical aerial photographs, there appears to have been little or no commercial activity on those portions of the Site and therefore, ecologic exposures are not significant.

8.0 REMEDIAL ACTION OBJECTIVES

EPA developed a range of alternatives to address the contamination at the Site. The alternatives were based upon the following remedial action objectives:

- prevent further migration of contaminants to the groundwater,
- reduce the levels of contaminant in groundwater to drinking water standards, and
- prevent ingestion of contaminated groundwater until the cleanup standards are attained.

EPA then developed specific remedial goals to meet these objectives. The soil cleanup goals are intended to stop the soil contaminants from impacting groundwater. During the development of the soil cleanup goals, EPA considered cleanup goals used at other sites in Florida and the State of Florida's default soil cleanup target levels for leachability. The State of Florida's soil cleanup goals are not ARARs, but are classified as "to be considered." Their use as cleanup goals is acceptable at this site given the lack of other, more site-specific cleanup levels and the fact that the area of soil contamination, based upon the leachability cleanup levels, corresponds with a known or probable area of contaminant discharge. In addition, groundwater contamination is present in the shallow groundwater near the area of identified soil contamination. Therefore, the leachability cleanup levels may not be appropriate for any scattered locations where soil contaminants are present but groundwater contamination is not present.

EPA evaluated alternatives that would remediate the groundwater to federal and state primary drinking water standards which are designed for the protection of human health. The short term goals are based upon reducing the groundwater contaminant concentrations so that natural attenuation will be more effective on the remaining lower level concentrations. The long term cleanup goals are the levels that are expected to be ultimately achieved upon completion of the remedial action.

9.0 DESCRIPTION OF ALTERNATIVES

The following remedial alternatives were developed to remediate the soil and groundwater contamination:

Soil Alternatives:

Soil Alternative S-1: No Action

Soil Alternative S-2: Excavation and Off-Site Disposal

Groundwater Alternatives:

Groundwater Alternative GW-1: No Action

Groundwater Alternative GW-2: Connections to Public Water, Monitored Natural Attenuation, and Institutional Controls

Groundwater Alternative GW-3: Connections to Public Water, Air Stripping, Monitored Natural Attenuation, and Institutional Controls

Groundwater Alternative GW-4: Connections to Public Water, In-Well Air Stripping, Monitored Natural Attenuation, and Institutional Controls

Groundwater Alternative GW-5: Connections to Public Water, In-Situ Chemical Oxidation, Monitored Natural Attenuation, and Institutional Controls

9.1 Description of Remedy Components

Alternatives S-1 and GW-1: No Action

Estimated total present worth cost: \$0

- The National Contingency Plan (NCP) requires the consideration of a no action alternative as a basis for comparison to other alternatives. Under the no action alternative, the site is left “as is” and no funds are expended for monitoring, control, or cleanup of the Site. This remedial alternative would not include any measures to remove, treat, or contain soil contaminants or restrict further migration of groundwater contamination. If implemented, this alternative would be considered the final remedy and would not involve any periodic reviews to verify its protectiveness.

Alternative S-2: Excavation and Off Site Disposal

Estimated total present worth cost: \$169,578

- **Excavation:** Under this alternative, the surface and subsurface soil which exceeds the selected soil cleanup goal necessary for protection of groundwater would be excavated. Based on the findings of the RI, the area of soil to be excavated would be limited to the area south of the industrial waste treatment plant (IWTP). It was assumed that the soil would be excavated to five feet below ground surface, which is 0.5 feet deeper than the deepest contamination recorded. Based on these assumptions, the calculated volume of excavated soil would be 330 cubic yards.

Prior to excavation, the area to be excavated would be surveyed and marked. A concrete pad with curbs and a sump would be prepared for the purpose of decontaminating the excavation equipment. The wastewater generated during decontamination would be stored, tested, and disposed of properly. Dust suppression by wetting the soil would be performed as necessary. Trucks to transport soil to an approved disposal facility would enter designated areas of the Site and would be directed to a specific loading area. Movement of the trucks will be kept to a minimum on-site to prevent the spread of contamination off-site. Each truck must adhere to U.S. Department of Transportation (DOT) requirements for hazardous waste transport including proper manifesting.

Off-site clean soil capable of sustaining vegetation would be used to fill the excavated area. The clean fill would be placed in the excavated area and compacted in 12-inch lifts to approximately 90 percent of the soils standard Proctor maximum dry density. The area would then be graded to match the contour of adjacent undisturbed land. All areas disturbed by excavation would be revegetated or covered with crushed stone.

- **Off-Site Disposal:** The excavated soil would be sent off-site to a RCRA permitted facility for disposal. For purposes of this study, it was assumed that the excavated soil would be managed as a RCRA F002 listed waste. In accordance with the land disposal treatment standard in 40 CFR 268.40, the treatment standard for the contaminants of concern (tetrachloroethylene, and 1,1,1, trichloroethane) is 6 milligrams per kilogram (mg/kg). The highest observed level of these contaminants at the Solitron Site is 35 mg/kg. For contaminated soil, it is acceptable to meet the alternate treatment standards which is higher of either 90% reduction in contaminants or 10 x the Universal Treatment Standards (UTS) for any constituents that could be present. As an example, the highest level of PCE detected in soil is 35 mg/kg. The 90 % reduction requirement results in a treatment level of 3.5 mg/kg. The 10 x UTS requirement would result in a treatment level of 60 mg/kg. The highest value is 60 mg/kg and that is the threshold for PCE to determine if the soil has to be treated prior to disposal. Given that the highest level detected is less than the treatment standard, the soil can likely be disposed in a RCRA landfill without prior treatment. The nearest permitted hazardous waste landfill is the Waste Management facility in Emelle, Alabama. The estimated cost including transportation is \$210 per ton.

Alternative GW-2: Connections to Public Water, Monitored Natural Attenuation, and Institutional Controls

Estimated total present worth cost: \$ 2,171,201

- **Connections to Public Water:** Under this alternative, all homes, churches, and businesses in an area 2,000 feet downgradient (north and east) of the Site not currently connected to the City of Port Salerno or Martin County public water supply would be offered a connection to public water. EPA would pay for the connection fees as part of this alternative, but residents would be responsible for the monthly water bills.
- **Monitored Natural Attenuation:** This alternative would also include long-term groundwater monitoring of both groundwater monitoring wells and a representative number of private drinking water wells to ensure contaminants in the groundwater naturally attenuate to levels below the cleanup goals. It is expected to take approximately 25 years to reach the groundwater cleanup levels.
- **Institutional Controls:** Institutional controls under this alternative would include deed notices to prevent the installation of drinking water wells at the Site until the cleanup levels are reached and to ensure that if the current building foundations are disturbed in the future, that the soil underneath is tested and treated properly. EPA has notified all residents within the estimated area of the groundwater contamination. Additionally, EPA has also notified the appropriate county, state, or water management district offices of the groundwater contamination. Anyone who applies for a permit to install a well in the designated area should be notified by the county health department of the potential groundwater contamination. As for all remedies at this Site, a policy five-year review would be required since concentrations of chemicals are at levels above those that would otherwise allow unrestricted use of the groundwater.

Alternative GW-3: Connections to Public Water, Air Stripping, Monitored Natural Attenuation and Institutional Controls (with three evaluated scenarios)

Estimated total present worth cost: GW-3(a): \$ 3,678,010; GW-3(b): \$ 3,151,998; GW-3(c): \$ 2,519,871

- **Connections to Public Water and Institutional Controls:** This alternative would include all of the provisions for connections to public water and institutional controls contained in Alternative GW-2.
- **Air Stripping:** Under this alternative, the active groundwater treatment technology air stripping would be used to treat the most highly contaminated groundwater. This technology works by pumping contaminated groundwater out of the aquifer through extraction wells located at points throughout the contaminant plume. The groundwater is then be pumped to an air stripping system which volatilizes the VOC contaminants. The volatilized vapor is then treated by adsorption onto granular activated carbon (GAC). The

treated water then exits the air stripping system and is either returned to the aquifer via recharge wells on-site in compliance with underground injection requirements or discharged to a local surface water body, which in this case is an unnamed tributary of the Manatee Pocket located approximately ¼ mile from the Site. A National Pollutant Discharge Elimination System (NPDES) permit would be required prior to any discharge. Additional studies would be necessary during the remedial design to determine the optimum well locations for groundwater extraction and whether reinjection or discharge to a surface water body would be preferred. Other important factors are that the plume is located in a residential area, private land would have to be accessed for well and system installation, and the system must be designed to have minimal impact to residences. Based on the available information, it has been estimated that an extraction system with a capacity of 480 gallons per minute (252,228,000 gallons per year) would capture all the contaminated groundwater. The extraction system would need a capacity of 127 gallons per minute (66,751,200 gallons per year) to capture just the contaminated groundwater on-site.

Periodic groundwater monitoring would be performed in order to track contaminant migration and to evaluate the effectiveness of the treatment system.

- **GW-3(a):** Under GW-3(a), all contaminated groundwater would be captured and treated with no monitored natural attenuation. It is estimated that under GW-3(a), it would take approximately 25 years to attain the cleanup levels. The estimated total present worth cost of the cleanup under this scenario is \$3,678,010.
- **GW-3(b):** Under GW-3(b), only the on-site contaminated groundwater would be captured and treated. Since the on-site groundwater contains the highest levels of contaminants and the off-site groundwater contamination is relatively low, off-site groundwater would be allowed to naturally decrease below the cleanup levels through monitored natural attenuation. It is estimated that under GW-3(b), it would take approximately 25 years to attain the cleanup levels. The estimated total present worth cost of the cleanup under this scenario is \$ 3,151,998.
- **GW-3(c):** GW-3(c) assumes the localized treatment of the highest levels of on-site groundwater. The area to be treated would be determined by comparison to the State of Florida's natural attenuation default criteria (NADC). The groundwater treatment system (air stripping) would be operated until attainment of the NADC (short term cleanup goals). Any remaining on-site and off-site contamination would be reduced by monitored natural attenuation to the cleanup level. It is expected to take approximately 10 years to attain the short term cleanup goals. Additional aquifer data collected during the implementation of the active remedial system will be used to predict the amount of time it will take natural attenuation to reach the cleanup levels. The estimated total present worth cost of the cleanup under this scenario is \$ 2,519,871.

Alternative GW-4: Connections to Public Water, In-Well Air Stripping, Monitored Natural Attenuation, and Institutional Controls (with two evaluated scenarios)

Estimated total present worth cost: GW-4(a): \$ 5,365,116; GW-4(b): \$ 2,963,957

- **Connections to Public Water and Institutional Controls:** This alternative would include all of the provisions for connections to public water and institutional controls contained in Alternative GW-2.
- **In-Well Air Stripping:** Under this alternative, an in-well VOC removal system would volatilize VOCs contained in groundwater and remove them as a vapor. This technology converts groundwater contamination into a vapor that is vacuum extracted and treated. At the same time, air-lift pumping circulates the groundwater, which becomes cleaner with each pass through the in-well air stripper. The only input to the system is air, which is injected into the well. The only output of the system is gas that is removed from the well; this gas contains the VOCs removed from the groundwater. After removal, this VOC vapor is adsorbed onto granular activated carbon (GAC). The GAC is regenerated and reused. No major facilities are needed for this technology. Power is needed to operate the pumps and compressors. The method itself involves no moving parts beneath the ground surface; however, careful packer and well designs would be required to successfully divert the groundwater from the well back into the desired depth of the aquifer.

Periodic groundwater monitoring would be performed in order to track contaminant migration and to evaluate the effectiveness of the treatment system.

- **GW-4(a):** This scenario assumes the capture and treatment of all contaminated groundwater with treatment lasting for about 25 years with no monitored natural attenuation. The estimated total present worth cost of the cleanup under this scenario is \$ 5,365,116.
- **GW-4(b):** GW-4(b) assumes the localized treatment of the highest levels of on-site groundwater. The area to be treated would be determined by comparison to the State of Florida's natural attenuation default criteria (NADC). The groundwater treatment system (in well air stripping) would be operated until attainment of the NADC (short term cleanup goals). Any remaining on-site and off-site contamination would be reduced by monitored natural attenuation to the cleanup level. It is expected to take approximately 10 years to attain the short term cleanup goals. Additional aquifer data collected during the implementation of the active remedial system will be used to predict the amount of time it will take natural attenuation to reach the cleanup levels. The estimated total present worth cost of the cleanup under this scenario is \$ 2,963,957.

Alternative GW-5: Connections to Public Water, In-Situ Chemical Oxidation with Monitored Natural Attenuation, and Institutional Controls

Estimated total present myth cost: \$ 3,752,116

- **Connections to Public Water and Institutional Controls:** This alternative would include all of the provisions for connections to public water and institutional controls contained in Alternative GW-2.
- **In-Situ Chemical Oxidation with Monitored Natural Attenuation:** This technology uses strong oxidizing agents such as potassium permanganate or sodium permanganate that convert various organic contaminants into naturally occurring compounds including manganese dioxide and carbon dioxide, chloride and hydrogen ions.

The oxidizing chemicals can be delivered in several ways. One method involves injecting the material into the aquifer at hundreds closely spaced points. The injection can be done using direct push technology for shallow depths (approximately 40 feet) or traditional well drilling techniques to install injection points at greater depths. Another method involves the use of several injection and extraction wells. The oxidant is added into the injection wells and flows into the aquifer. Groundwater and the oxidant are then withdrawn by the extraction wells and the withdrawn mixture is pumped back to the injection wells in compliance with the Underground Injection Control Program. Better hydraulic control of the contaminants and oxidants may be possible with this latter system. However, the optimal delivery system would be determined during the remedial design.

This method is suited to the conditions found on-site, including groundwater contamination which has higher concentrations, is found at shallower depths, and which is not as dispersed as the off site groundwater contamination. The treatment is expected to reduce groundwater contaminants to levels at or below the natural attenuation default criteria. Natural attenuation would continue to reduce the contaminant levels to the cleanup levels after the chemical oxidation treatment is completed.

Periodic groundwater monitoring would be performed in order to track contaminant migration and to evaluate both the effectiveness of the treatment system and the progress of the natural attenuation of the groundwater.

10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP established nine criteria which are used in comparing the advantages and disadvantages of each alternative. This chapter describes the nine criteria and summarizes EPA's evaluation of the alternatives using these nine criteria.

The first two criteria, Overall Protection of Human Health and the Environment and Compliance with Applicable or Relevant and Appropriate Requirements (ARARs), are called threshold criteria and must be satisfied. A cleanup method that does not meet these criteria will not be selected.

The next five criteria, Long-Term Effectiveness and Permanence, Reduction of Toxicity, Mobility, or Volume, Short-Term Effectiveness, Implementability, and Cost are called primary balancing criteria and are evaluated as a basis for comparing the alternatives.

The other two criteria, State Acceptance and Community Acceptance, are called modifying criteria and are considered by EPA when making a cleanup decision. These two criteria are considered after the comments are received on the Proposed Plan.

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

The no action alternative (S-1/GW-1) is not protective of human health or the environment. Soil contamination would remain which may contribute to the underlying groundwater contamination. Groundwater contamination has already impacted some private drinking water wells and may threaten more wells in the future. Because the no action alternative would not be protective of human health and the environment, it was eliminated from consideration under the remaining eight criteria.

Alternative S-2 is protective because the contaminated soil would be removed from the Site and disposed in a proper disposal facility. Alternatives GW-2, GW-3, GW-4, and GW-5 would all be protective of human health and the environment. Human health is protected through the replacement of private water wells with connections to the public water supply. Alternatives GW-3, GW-4, and GW-5 include active treatment methods for groundwater. Alternative GW-2 relies solely upon natural attenuation to improve groundwater quality.

Compliance With ARARs

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as “ARARs” unless such ARARs are waived under CERCLA section 121(d)(4).

Alternatives GW-2, GW-3, GW-4, and GW-5 would all comply with drinking water standards because public water connections would be offered to those residents potentially impacted by contaminated groundwater. These alternatives would also ultimately satisfy the drinking water standards in groundwater through natural attenuation, treatment, or a combination of both. Alternative GW-3 would comply with the substantive requirements of the Underground Injection Control program or the NPDES program depending upon the discharge method determined during the design. Alternative GW-5 would comply with the substantive requirements of the Underground Injection Control program

Alternative S-2 would comply with RCRA and DOT regulations related to the transport and disposal of the contaminated soil, which may be considered a hazardous waste.

Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk and the adequacy and reliability of controls.

Alternatives GW-2, GW-3, GW-4, and GW-5 would all be effective and permanent in the long term. However, alternative GW-2 would take 30 years or more to achieve groundwater cleanup goals. Alternatives GW-3 and GW-4 would take between 10 and 25 years to achieve cleanup levels. Alternative GW-5 would take approximately 10 years to achieve cleanup levels.

Alternative S-2 would satisfy this criteria at the Site because the contaminated soil would be removed and replaced with clean soil.

Reduction of Toxicity, Mobility, or Volume

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

All the alternatives will achieve some reduction in the toxicity, mobility, and volume of the VOCs in soil and groundwater. Alternatives GW-2, GW-3, GW-4, and GW-5 would all reduce the mobility of groundwater contaminants because of a reduction in overall pumping from private water wells near the Site. The combined pumping of the various nearby wells partly contributes

to the northeastern movement of groundwater contaminants. Alternatives GW-3, GW-4, and GW-5 all include treatment that will reduce the toxicity and volume of contaminated groundwater. Alternatives GW-3 and GW-4 include different scenarios that range from treating all the contaminated groundwater to treating the highest levels of contaminants, which are found on-site, and letting the rest degrade naturally. Each groundwater alternative and scenario will ultimately achieve the cleanup goals. The difference is how quickly the goals are achieved. Alternative GW-2 will be the slowest method; alternative GW-5 would be the quickest method.

Alternative S-2 will reduce the volume of contaminated soil at the Site.

Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers and the community during construction and operation of the remedy until cleanup goals are met.

Alternatives GW-2, GW-3, GW-4, and GW-5 would all share some short term effectiveness due to the connections to the public water system. However, alternative GW-5 is higher in short term effectiveness because the active treatment phase would be completed within a couple of months therefore, reaching the short term cleanup goals more quickly.

Alternative S-2 would also satisfy this criteria because the excavation and disposal of soil and backfilling of the excavation could be accomplished in about a month.

Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

All the alternatives can be implemented using standard techniques, though each will have details to work out. The individual connections to public water will require the consent of each property owner. Alternatives GW-3 and GW-4 will require the installation of groundwater extraction wells and connections for electricity. GW-3 and GW-4 may require the installation of extraction wells and potentially reinjection wells in a portion of the residential area. Alternative GW-5 may require a small scale test of the system prior to full scale operation and would be implemented only on-site.

Cost

A summary cost comparison is provided below in Table 10-1. The estimated present worth costs for the alternatives range from \$0 for no action to \$ 5,365,116 for GW-4: reduction of groundwater exposure and in-well air stripping. Different scenarios are given for alternatives

GW-3 and GW-4. The scenarios differ by the amount of contaminated groundwater to be treated and the extent to which monitored natural attenuation is used. The larger the amount of groundwater to be treated via active groundwater treatment, the greater the cost. The costs are lowered by using the treatment alternatives to treat the highest levels of contamination and then allowing the lower level contaminants to naturally degrade over time. The capital costs for GW-5 is highest at \$ 3,515,759. However, GW-5 has the lowest amount of O&M costs. The discount rate used was 3.5%.

Table 10-1 - Cost Comparison for Remedial Alternatives (Amounts in Dollars)				
Alternative Number	Alternative Description	Capital Cost	Annual O&M Cost	Total Present Worth Cost
S-1/GW-1	No Action	0	0	0
S-2	Soil Excavation and Off-Site Disposal	169,578	0	169,578
GW-2	Connections to Public Water, Natural Attenuation, and Institutional Controls	1,648,500	28,420/year (30 years)	2,171,201
GW-3	Connections to Public Water, Groundwater Treatment via Air Stripping with Natural Attenuation, and Institutional Controls	2,055,900	98,420/year for 25 years	3,678,010 <i>GW-3(a)</i>
		1,876,000	77,420/year for 25 years	3,151,998 <i>GW-3(b)</i>
		1,876,000	77,420/year for 10 years	2,519,871 <i>GW-3(c)</i>
GW-4	Connections to Public Water, Groundwater Treatment via In-Well Air Stripping with Natural Attenuation, and Institutional Controls	2,589,300	168,420/year for 25 years	5,365,116 <i>GW-4(a)</i>
		1,918,700	63,420/year for 10 years	2,963,957 <i>GW-4(b)</i>
GW-5	Connections to Public Water, Groundwater Treatment via In-Situ Chemical Oxidation with Natural Attenuation, and Institutional Controls	3,515,759	28,420/year for 10 years	3,752,116

Community Acceptance

Based on the responses received during the public comment period, the community supports the selected remedy. The public comments and EPA responses are contained in the Responsiveness Summary, found in appendix B.

State Acceptance

In accordance with the NCP, the Florida Department of Environmental Protection (FDEP), as the support agency and representative of the State of Florida, provided input during the RI/FS process. As part of the review of the draft Proposed Plan, the FDEP staff have indicated a verbal agreement with the overall cleanup, but have expressed an interest in adding some degree of hydraulic control for the more contaminated portion of the on-site plume. FDEP indicated a preference for GW-5 based on their experience of the effectiveness of chemical oxidation in Florida as a treatment method for groundwater contaminated with VOCs versus the effectiveness of the traditional “pump and treat” technology included in GW-3 and GW-4.

11.0 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure. The manner in which principal threat wastes are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied.

At this Site, there are no liquid source materials such as drums or tanks, and the concentrations of contaminants have not been found at levels that would pose acute health threats from direct contact. Additionally, no levels of VOCs have been found that would suggest a dense non-aqueous phase liquid (DNAPL) is present. However, the VOCs in the soil have been determined to be the principal threat to the groundwater. Since the volume of these soils is relatively small (estimated 330 cubic yards), an on-site treatment system would not be cost effective. Therefore, the soils which constitute the principal threat will be excavated and sent off-site for disposal at a RCRA permitted landfill.

12.0 SELECTED REMEDY

12.1 Summary of the Rationale for the Selected Remedy

Based on consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public and State comments, EPA has selected a remedy to address the contaminated soil and groundwater at this Site. At the conclusion of the remedy, the potential risk associated with exposure to soil will be less than 1×10^{-6} and the potential risk for exposure to groundwater will be within the acceptable risk range of 10^{-4} to 10^{-6} . The soil cleanup is driven by the protection of groundwater. The soil cleanup goals are much lower than what is necessary to protect human health. The groundwater cleanup is based on ultimately satisfying the state or federal primary drinking water standards. EPA considers these hazard levels to be protective of human health and the environment and are based on an EPA approved site specific risk assessment. A review of the remedy will be conducted every five years until the cleanup levels are met.

The selected remedy is believed to be the most effective remedial strategy taking into consideration effectiveness versus cost. The selected groundwater remedy will have minimal impact on the residents in the area as compared to the other remedies. Additionally, the groundwater remedy has a better short term effectiveness because the oxidation treatment phase is expected to reach the cleanup levels faster than the other groundwater remedies. Even though the capital cost for the selected groundwater remedy is greater than the other remedies, the O&M costs are much smaller. A discussion of the cost effectiveness of the selected remedy is given in section 13.3. The remedy may change somewhat as a result of the remedial design and construction processes. Changes to the remedy will be documented appropriately, including entries in the administrative record, explanation of significant difference, or ROD amendment, depending upon the significance of any such changes.

12.2 Description of the Selected Remedy

EPA has selected alternative S-2, *Excavation and Off-Site Disposal*, as the alternative for remediating the soil and alternative GW-5, *Connections to Public Water, In-Situ Chemical Oxidation with Monitored Natural Attenuation, and Institutional Controls* as the alternative for remediating the groundwater at the Solitron Microwave Site. The total present worth cost of the selected remedy, Alternatives S-2 and GW-5, is estimated at \$3.92 million.

The preferred alternative would involve the following activities:

1) Soil Excavation and Off-Site Disposal:

All soil which exceeds the contaminant levels which have been determined to be necessary to prevent leaching of contaminants to the groundwater will be excavated (an estimated 330 cubic yards). Based on the findings of the RI, the area of soil to be excavated will be limited to the area south of the industrial waste treatment plant (IWTP). Prior to excavation, the area to be excavated will be surveyed and marked. A concrete pad with curbs and a sump will be prepared for the purpose of decontaminating the excavation equipment. The wastewater generated during decontamination will be stored, tested, and disposed of properly.

The excavated soil will be sent off-site to a permitted facility for disposal. Dust suppression by wetting the soil will be performed as necessary. Trucks to transport soil to the approved disposal facility will enter designated areas of the Site and be directed to a specific loading area. Movement of the trucks will be kept to a minimum on-site to prevent the spread of contamination off-site. Each truck must adhere to U.S. Department of Transportation (DOT) requirements for hazardous waste transport including proper manifesting.

Once the excavation is complete, off-site clean soil capable of sustaining vegetation will be used to fill the excavated area. The clean fill will be placed in the excavated area and compacted in 12-inch lifts to approximately 90 percent of the soils standard Proctor maximum dry density. The area will then be graded to match the contour of adjacent undisturbed land. All areas disturbed by excavation will be revegetated or covered with crushed stone as appropriate.

2) Connections to Public Water:

All homes, churches, and businesses in an area 2,000 feet downgradient (north and east) of the Site not currently connected to the City of Port Salerno or Martin County public water supply will be offered a connection to public water. EPA will pay for the connection fees as part of this alternative, but residents will be responsible for the monthly water bills. The exact area to be provided public water extensions will be determined during the remedial design based on the private well data collected by the Martin County Health Department. It includes an area approximately bounded by Grouper Avenue, Lincoln Street, Front Avenue, 48th Avenue, and Murray Street. The most recent private well data, from May/June of 1999, showed scattered detections of site related contaminants in this area both north and east of the Site. The detected levels were below primary drinking water standards, but indicate the potential for continued migration of the contaminants in groundwater. The areal extent of planned water line extensions is sufficient to encircle all homes where detectable levels of contaminants were found.

3) In-Situ Chemical Oxidation with Monitored Natural Attenuation:

The area of groundwater contamination which is above the short term cleanup level will be treated using in-situ chemical oxidation. This technology uses strong oxidizing agents such as potassium permanganate or sodium permanganate which convert various organic contaminants into naturally occurring compounds including manganese dioxide and carbon dioxide, chloride and hydrogen ions. The oxidizing chemicals can be delivered in several ways. One method involves injecting the material into the aquifer at hundreds closely spaced points. The injection can be done using direct push technology for shallow depths (approximately 40 feet) or traditional well drilling techniques to install injection points at greater depths. Another method involves the use of several injection and extraction wells. The oxidant is added into the injection wells and flows into the aquifer. Groundwater and the oxidant are then withdrawn by the extraction wells and the withdrawn mixture is pumped back to the injection wells. Better hydraulic control of the contaminants and oxidants may be possible with this latter system. However, the optimal delivery system would be determined during the remedial design. Periodic groundwater monitoring will be performed in order to track contaminant migration and to evaluate the effectiveness of the treatment system.

Chemical oxidation has been shown to be effective for treating groundwater in Florida with conditions similar to those found on-site which include groundwater contamination that is found at high concentrations and shallow depths, and which is not as dispersed as the off-site groundwater contamination. In-situ chemical oxidation will be used to reduce groundwater contaminants to levels at or below the short term cleanup goals shown in Table 12-3. After implementation of this part of the groundwater remedy, a monitoring network and sampling plan will be developed to ensure the remaining contaminants naturally attenuate to below the long term cleanup levels. PCE breakdown compounds have been detected at the outer edges of the plume, which indicate that the contaminants are naturally degrading. EPA expects that by removing the source (soil), and treating the most highly contaminated area of groundwater contamination (area within the Florida Natural Attenuation Default Criteria), the remaining contaminants will naturally attenuate to the cleanup levels. Groundwater monitoring will continue until final groundwater cleanup levels are met. Additional monitoring wells are necessary to fully track the extent of the plume. Continued evaluation, including a review of data collected during the RD/RA, will be necessary in order to confirm the effectiveness of natural attenuation. In addition, the RD will include an evaluation of potential hydraulic control measures for the more contaminated portion of the on-site plume to determine if it is necessary to keep the plume from expanding during treatment.

4) Institutional Controls:

Institutional controls to prevent the use of contaminated groundwater until cleanup goals are met. Institutional controls will include deed notices on the Site to prevent the installation of water wells until groundwater cleanup levels have been met. The local health department is aware of the groundwater contamination so that it can give appropriate consideration to future well

permits submitted for the impacted area. Deed notices for the Site will also note the need for further soil sampling and proper handling of soils underneath the plant buildings if those buildings are demolished. EPA has performed some limited sampling through the floor slab and did not find any soil contamination. However, additional soil sampling would be prudent; the proper handling and disposal of the soil would be based upon the sampling results.

12.3 Summary of the Estimated Remedy Costs

The summary of the estimated costs of the selected remedy can be found in table 12-1. The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or a ROD amendment. This is an engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost. A discount rate of 3.5% was used for the estimate.

TABLE 12-1 COST ESTIMATE			
S-2: EXCAVATION AND OFF-SITE DISPOSAL OF SOIL			
CONSTRUCTION ITEMS	QUANTITY	UNIT PRICE	TOTAL COSTS
Project Plans		\$30,000.00	\$30,000
Mobilization and site preparation		\$3,000.00	\$3,000
Excavation	333 cy	\$5/cy	\$1,665
Off-site disposal (including transport)	450 tons	\$210/ton	\$94,500
Verification Sampling	10	\$250/ton	\$2,500
Backfill	333 cy	\$6/cy	\$1,998
Regrade/reseed		\$2,000.00	\$2,000.00
Subtotal			\$135,663
Contingencies (10% of subtotal)			\$13,566
Engineering, Administration (15% of subtotal)			\$20,349
Total Costs for S-2			\$169,578

COST ESTIMATE FOR GW-5: REDUCTION OF GROUNDWATER EXPOSURE AND CHEMICAL OXIDATION OF GROUNDWATER

CONSTRUCTION ITEMS	QUANTITY	UNIT PRICE	TOTAL COSTS
Injection of oxidant (using direct push equipment) for treatment less than 40 feet bgs	1	\$406,180.00	\$406,180
Installation/abandonment of injection points using traditional drilling techniques for treatment greater than 40 feet bgs.	200	\$2,875.00	\$575,000
Injection of oxidizing agent for treatment greater than 40 feet bgs.	1	\$352,577.00	\$352,577
Subtotal			\$ 1,333,757
Administration (15%)			\$200,063
Contingency (25%)			\$333,439
Capital Costs for chemical oxidation			\$1,867,259
Alternate Water Supply			
Deed notices			\$5,000
Public water supply connections to 155 residences	155	\$5,500.00	\$852,500
Design, specifications, regulatory approval, etc.		\$250,000.00	250,000
Install 125 ft. monitor wells	4	\$5,000.00	20,000
Natural Attenuation Study		\$50,000.00	50,000
Subtotal			1,177,500
Administrative costs (15%)			176,625
Contingency (25%)			294,375
Capital Costs for Alternate Water Supply			\$1,648,500
Total Capital Costs for Groundwater Remedy			\$3,515,759

Estimated Annual O&M Costs			
Sampling of wells (53)	1 event/year	\$4,800.00	\$4,800
Analysis of well samples (including QC samples)	64	\$125.00	\$8,000
Report Preparation		\$2,500.00	2,500
Other Expenses		\$5,000.00	5,000
Subtotal			20,300
Administration(15%)			3,045
Contingency(25%)			5,075
Subtotal for annual O&M costs			\$28,420
Total Present Worth O&M costs			\$236,357
Present Worth Total (Capital and O&M) of Groundwater Remedy			\$3,752,117
Total Present Worth (Capital and O&M) of Soil and Groundwater Remedy			\$3,921,695

12.4 Expected Outcome of Selected Remedy

The purpose of this action is to remove potential sources of groundwater contamination, prevent exposure to contaminated groundwater, and to achieve groundwater cleanup goals throughout the plume. According to the baseline risk assessment, exposure to soil at the Site does not pose an unacceptable risk. The risk to a future child resident from ingestion of soil and inhalation of contaminants in soil is 5.9×10^{-6} ; the hazard quotient is 0.16. Therefore, the soil cleanup levels (Table 12-2) were developed to prevent site contaminants from leaching into the groundwater. Based upon the available data, the Site would be available for residential use after the soil cleanup is complete. This statement does not extend to the area underneath the main building. Additional characterization of those soils would be appropriate if the building is demolished.

The active groundwater cleanup will focus on the highest levels of contaminants which are found in the shallow and intermediate groundwater on-site. The active groundwater treatment may be discontinued when the short term cleanup goals have been met. The overall groundwater cleanup, including natural attenuation, will not be complete until the long term cleanup goals (primary drinking water standards) have been achieved throughout the area of the plume. It is currently estimated that this combination of active treatment and natural attenuation will achieve the long term cleanup goals in about 10 years. Both the long term and short term cleanup levels are found in Table 12-3. The use of groundwater will be restricted until the long term cleanup goals have been met.

Due to the location of the Site, development of the Site is likely if not before the groundwater cleanup standards are met, then after remediation is complete. It is anticipated that any future development of the Site would use municipal water and therefore, even though unrestricted use of the groundwater would be available after the remedy is complete, no additional future use of the on-site groundwater would occur. However, since not all residents will connect to the municipal water supply, off-site groundwater will likely continue to be used as a drinking water source.

TABLE 12-2 Soil Cleanup Levels for Chemicals of Concern and Associated Risk			
Available Use After Cleanup: Residential			
Chemicals of Concern	Cleanup Level (mg/kg)	Basis for Cleanup Level	Risk at Cleanup level
cis-1,2-dichloroethene	0.4	Groundwater protection	$<1 \times 10^{-6}$
tetrachloroethene	0.03	Groundwater protection	$<1 \times 10^{-6}$
trichloroethene	0.03	Groundwater protection	$<1 \times 10^{-6}$

TABLE 12-3
Groundwater Cleanup Levels
for Chemicals of Concern and Associated Risk

Available Use After Cleanup: Drinking Water

Chemicals of Concern	Short Term Cleanup Goal ⁽¹⁾ (ug/l)	Long Term Cleanup Level (ug/l)	Risk at Cleanup level
1,1-dichloroethene	700	7 ⁽²⁾	2.97x10 ⁻⁵ (C)
cis-1,2-dichloroethene	700	70 ⁽²⁾	0.45 (HQ)
tetrachloroethene	300	3 ⁽³⁾	8.87x10 ⁻⁷ (C)
trans-1,2-dichloroethene	1000	100 ⁽²⁾	0.32 (HQ)
trichloroethene	300	3 ⁽³⁾	2.8x10 ⁻⁷ (C)
vinyl chloride	100	1 ⁽³⁾	1.2x10 ⁻⁵ (C)

¹ The short term cleanup goals are consistent with Florida's Natural Attenuation Default Criteria. For more information on how the NADC's were used in developing the cleanup goals, see Section 8.0 of this ROD.

² National Primary Drinking Water Standard

³ Florida Primary Drinking Water Standard

NS = no primary standard

C= carcinogenic risk

HQ= hazard quotient for non-carcinogenic risk

13.0 STATUTORY DETERMINATIONS

EPA has determined that the selected remedy will satisfy the statutory determinations of Section 121 of CERCLA. The remedy will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will use permanent solutions and alternative treatment technologies to the maximum extent practicable.

13.1 Protection of Human Health and the Environment

The selected remedy will protect human health through the extension of public water lines to additional nearby homes in the approximate area of the groundwater plume. Additional protection will be provided by institutional controls, including deed restrictions on the Site and notices to nearby residents. The controls will limit the consumption of groundwater until the cleanup levels have been attained. Long term protection will also be provided through treatment and natural attenuation of groundwater contaminants. The soil cleanup will protect the environment by removing a potential source of soil to groundwater contamination. The soil cleanup will also further reduce the risks to human health which is already within the acceptable risk range. The soil and groundwater cleanup will reduce exposure levels to ARAR levels or to within EPA's generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogens and below the HI of 1 for non-carcinogens.

13.2 Compliance with ARARs

The selected remedy will comply with all Federal ARARs and any more stringent State ARARs as listed in the Table 13-1.

TABLE 13-1: ARARS		
ACTION SPECIFIC		
Resource Recovery and Conservation Act		
A	40 CFR 262	Standards for generators of hazardous wastes. Applicable to soil removal
A	40 CFR 263	Standards for transporters of hazardous wastes if manifest required by 40 CFR 262. Applicable to soil removal
A	40 CFR 264	Standards for facilities that treat, store, or dispose of hazardous wastes. Applicable to soil removal/disposal
Safe Drinking Water Act		
A	10 CFR Parts 144-147	Underground Injection Control requirements. May be applicable to the injection of oxidants.
Occupational Safety and Health Act		
A	29 CFR 1910	Regulations for worker's health and safety at hazardous waste sites
Hazardous Materials Transportation Act		
A	49 CFR 107, 171-177	Regulations for off-site transportation of Department of Transportation-defined hazardous materials
Endangered Species Act		
A	50 CFR Part 200 and 402	Requires actions to conserve endangered species or critical habitats. MAY be applicable; gopher tortoise burrow noted on-site Burrow may be used by the threatened eastern indigo snake.
CHEMICAL SPECIFIC		
Resource Recovery and Conservation Act		
A	40 CFR 268.48 and 40 CFR 268.49	Universal treatment standards and alternative LDR treatment standards for contaminated soil.
Safe Drinking Water Act		
R&A	40 CFR Part 141	National Primary Drinking Water Standards - health based standards for public water systems (maximum contaminant levels (MCLs)).
Florida Drinking Water Standards		
R&A	FAC 62-550	Florida Primary Drinking Water Standards
<p>A = APPLICABLE REQUIREMENTS WHICH WERE PROMULGATED UNDER FEDERAL LAW TO SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION LOCATION OR OTHER CIRCUMSTANCE AT THE SITE.</p> <p>R & A = RELEVANT AND APPROPRIATE REQUIREMENTS WHICH WHILE THEY ARE NOT "APPLICABLE" TO A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, LOCATION, OR OTHER CIRCUMSTANCE AT THE SITE, ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT THE SITE THAT THEIR USE IS WELL SUITED TO THE SITE.</p>		

13.3 Cost Effectiveness

In EPA's judgement, the selected remedy is cost effective and represents a reasonable value for the money to be spent. The following definition was used in making this determination: "A remedy shall be cost effective if its costs are proportional to its overall effectiveness." (40 CFR 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long term effectiveness and permanence, reduction in toxicity, mobility, and volume through treatment, and short term effectiveness. Overall effectiveness was then compared to costs to determine cost effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence represent a reasonable value for the money to be spent.

All the alternatives, except the no-action alternative, include the extension of water lines to the nearby residences and a soil removal to address a potential source of groundwater contamination. The overall effectiveness and cost effectiveness of the groundwater remedies differs because of the time estimated to achieve the cleanup levels and related process efficiencies. Alternative GW-2, natural attenuation, would take 30 years or more to achieve groundwater cleanup goals. Alternatives GW-3 and GW-4, pump and treat remedies, would take between 10 and 25 years to achieve cleanup levels. Alternatives GW-3 and GW-4 also included different scenarios for varying durations of active treatment. Alternative GW-5, in-situ chemical oxidation, would take approximately 10 years to achieve cleanup levels. Alternative GW-3(c) is the least expensive active treatment alternative. Alternative GW-4(a) is the most expensive remedy. GW-5 has higher initial capital costs, but has no long term operating costs and would likely achieve the cleanup levels faster than the other alternatives.

13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy will be a permanent solution for the Site in that contaminated soil will be removed, public water lines will be extended, and active groundwater treatment and monitoring will be utilized.

13.5 Preference for Treatment as a Principal Element

The preference for treatment as a principal element will be satisfied because of the groundwater treatment component of the selected remedy. On-site treatment of the soil is not a preferred method because of the small volume of soil (330 cubic yards) to be addressed.

13.6 Five-Year Review Requirements

Section 121(c) of CERCLA and the NCP provide the statutory and legal bases for conducting five year reviews. Because it is estimated to take more than five years to attain the cleanup levels specified in the ROD which will allow unlimited use and unrestricted exposure after completion of the remedial action, it is EPA's policy to conduct a review of the remedial action no less often than each five years after the initiation of the remedial action to assure that human health and the environment are being protected by the remedial action being implemented. EPA will conduct policy five year reviews at the Solitron Site until the cleanup levels specified in the ROD have been met.

14.0 DOCUMENT OF SIGNIFICANT CHANGES

The proposed plan was released for public comment in July 2000. Figure 3 incorrectly identified the extent of the highest and lowest levels on contaminated groundwater. The dashed, outer ring should have been identified in the legend as the “presumed limit of **lowest** levels of contaminated groundwater” and the solid, inner ring should have been identified as the “presumed limit of **highest** levels of contaminated groundwater”. This error was only present in the figure and was correctly explained at the proposed plan meeting.

The proposed plan identified soil excavation and off site disposal, extension of public water lines to homes located north and east of the Site within about 3/8 mile of the Site, treatment of the groundwater via chemical oxidation with monitored natural attenuation of the remaining low-level groundwater contamination, and placement of institutional controls in the form of deed notices to limit future use of soil and groundwater until the cleanup levels are met, as the preferred remedy.

It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

APPENDIX A

RISK ASSESSMENT INFORMATION

Exposure Assumptions
Non-cancer toxicity data
Cancer toxicity data

TABLE 3.1
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
SOLITRON MICROWAVE SITE

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: On-Site Surface Soil

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Lognormal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
cis-1,2-Dichloroethene	mg/kg	0.67	23274.75	6.70		mg/kg	6.70	Max	EPA 4 (2)	NE	NE	NE
Tetrachloroethene	mg/kg	2.06	44.50	35.00		mg/kg	35.00	Max	EPA 4 (2)	NE	NE	NE
Trichloroethene	mg/kg	0.55	31.41	7.20		mg/kg	8.59	Max	(3)	NE	NE	NE
Chromium	mg/kg	10.68	60.67	83.00		mg/kg	60.67	95% UCL-T	EPA 4 (1)	NE	NE	NE
Copper	mg/kg	198.53	7633.97	1300.00		mg/kg	1300.00	Max	EPA 4 (2)	NE	NE	NE
Mercury	mg/kg	0.24	1.20	1.60		mg/kg	1.20	95% UCL-T	EPA 4 (1)	NE	NE	NE

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T);
Mean of Normal Data (Mean-N).

(1) EPA Region IV Guidance indicates that it is appropriate to assume that sampling data are lognormally distributed (Region 4 Bulletins, October 1996).

(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) The EPC for surface soil (7.2 mg/kg) is lower than that for the combined surface/subsurface soil (8.6 mg/kg). To be conservative, the EPC for surface/subsurface soil was used (see Table 3.4)
NE = Not Evaluated.

TABLE 3.2
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
SOLITRON MICROWAVE SITE

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: On-Site Particulates

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Lognormal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum Exposure			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
cis-1,2-Dichloroethene	mg/kg	0.67	23274.75	6.70		mg/kg	6.70	Max	EPA 4 (2)	NE	NE	NE
Tetrachloroethene	mg/kg	2.06	44.50	35.00		mg/kg	35.00	Max	EPA 4 (2)	NE	NE	NE
Trichloroethene	mg/kg	0.55	31.41	7.20		mg/kg	8.59	Max	(3)	NE	NE	NE
Chromium	mg/kg	10.68	60.67	83.00		mg/kg	60.67	95% UCL-T	EPA 4 (1)	NE	NE	NE
Copper	mg/kg	198.53	7633.97	1300.00		mg/kg	1300.00	Max	EPA 4 (2)	NE	NE	NE
Mercury	mg/kg	0.24	1.20	1.60		mg/kg	1.20	95% UCL-T	EPA 4 (1)	NE	NE	NE

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T);
Mean of Normal Data (Mean-N).

(1) EPA Region IV Guidance indicates that it is appropriate to assume that sampling data are lognormally distributed (Region 4 Bulletins, October 1996).

(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) The EPC for surface soil (7.2 mg/kg) is lower than that for the combined surface/subsurface soil (8.6 mg/kg). To be conservative, the EPC for surface/subsurface soil was used (see Table 3.4)

NE = Not Evaluated.

TABLE 3.3
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
SOLITRON MICROWAVE SITE

Scenario Timeframe: Current/Future
Medium: Surface/Subsurface Soil
Exposure Medium: Surface Soil
Exposure Point: On-Site Volatiles

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Lognormal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
cis-1,2-Dichloroethene	mg/kg	0.37	27.09	6.70		mg/kg	6.70	Max	EPA 4 (2)	NE	NE	NE
Tetrachloroethene	mg/kg	1.70	6.60	35.00		mg/kg	35.00	Max	(3)	NE	NE	NE
Trichloroethene	mg/kg	0.90	8.59	9.60		mg/kg	8.59	95% UCL-T	EPA 4 (1)	NE	NE	NE

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) EPA Region IV Guidance indicates that it is appropriate to assume that sampling data are lognormally distributed (Region 4 Bulletins, October 1996).

(2) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(3) The EPC for surface soil (35 mg/kg) is higher than that for the combined surface/subsurface soil. Therefore, for inhalation of volatiles, the EPC for surface soil was used.

NE = Not Evaluated.

TABLE 3.4
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: On-Site Shallow Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Lognormal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1-Dichloroethane	ug/L	64.4	N/A	910		ug/L	582.5	Average	EPA 4 (1)	NE	NE	NE
1,1-Diichloroethene	ug/L	20.8	N/A	340		ug/L	265	Average	EPA 4 (1)	NE	NE	NE
1,2,4-Trimethylbenzene	ug/L	1.4	N/A	11		ug/L	8.7	Average	EPA 4 (1)	NE	NE	NE
1,2-Dichloroethene (total)	ug/L	284.8	N/A	2900		ug/L	1112.5	Average	EPA 4 (1)	NE	NE	NE
Acetone	ug/L	95.5	N/A	3200		ug/L	2250	Average	EPA 4 (1)	NE	NE	NE
Chloroethane	ug/L	6.0	N/A	11		ug/L	8.3	Average	EPA 4 (1)	NE	NE	NE
Chloroform	ug/L	5.7	N/A	3	J	ug/L	2.3	Average	EPA 4 (1)	NE	NE	NE
cis-1,2-Dichloroethene	ug/L	364.2	N/A	3900		ug/L	2800	Average	EPA 4 (1)	NE	NE	NE
Napthalene	ug/L	1.3	N/A	2.2		ug/L	1.95	Average	EPA 4 (1)	NE	NE	NE
Tetrachloroethene	ug/L	53.2	N/A	1300		ug/L	853.3	Average	EPA 4 (1)	NE	NE	NE
trans-1,2-Dichloroethene	ug/L	6.8	N/A	51		ug/L	46.3	Average	EPA 4 (1)	NE	NE	NE
Trichloroethene (TCE)	ug/L	107.6	N/A	4100		ug/L	1322.5	Average	EPA 4 (1)	NE	NE	NE
Vinyl Chloride	ug/L	105.2	N/A	1800		ug/L	1237.5	Average	EPA 4 (2)	NE	NE	NE
Aluminium	mg/l	1.9	4.56	10	J	mg/l	4.6	95% UCL-T	EPA 4 (2)	NE	NE	NE
Arsenic	mg/l	0.003	0.004	0.02		mg/l	0.004	95% UCL-T	EPA 4 (2)	NE	NE	NE
Cadmium	mg/l	0.002	0.003	0.01		mg/l	0.003	95% UCL-T	EPA 4 (2)	NE	NE	NE
Chromium	mg/l	0.01	0.01	0.03		mg/l	0.01	95% UCL-T	EPA 4 (2)	NE	NE	NE
Copper	mg/l	0.14	0.22	2.2		mg/l	0.22	95% UCL-T	EPA 4 (2)	NE	NE	NE
Manganese	mg/l	0.17	1.02	1.2		mg/l	1.02	95% UCL-T	EPA 4 (2)	NE	NE	NE
Molybdenum	mg/l	0.01	0.01	0.02		mg/l	0.01	95% UCL-T	EPA 4 (2)	NE	NE	NE
Nickel	mg/l	0.08	0.12	1.1		mg/l	0.12	95% UCL-T	EPA 4 (2)	NE	NE	NE
Silver	mg/l	0.004	0.004	0.05		mg/l	0.004	95% UCL-T	EPA 4 (2)	NE	NE	NE
Yttrium	mg/l	0.002	0.003	0.01		mg/l	0.003	95% UCL-T	EPA 4 (2)	NE	NE	NE

Statistics: Maximum Detected Value (Max), 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Mean-T); Mean of Normal Data (Mean-N).

(1) Per EPA Region IV Guidance, groundwater EPCs were the arithmetic average of the wells in the maximally concentrated area (see Report Table 3-3) (Region 4 Bulletins, October 1996).

(2) Concentrations in metals in on-site groundwater were variable across the site. As a result, a 95% UCL was calculated for metal COPCs in on-site groundwater.

EPA Region IV Guidance Indicates that is appropriate to assume that sampling data are lognormally distributed (Region 4 Bulletins, October 1996).

NE = Not Evaluated.

N/A = Not Applicable

TABLE 3.6
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: On-Site Intermediate Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Lognormal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1-Dichloroethane	ug/L	31.4	N/A	490		ug/L	267.0	Average	EPA 4 (1)	NE	NE	NE
1,1-Diichloroethene	ug/L	8.9	N/A	170	J	ug/L	93	Average	EPA 4 (1)	NE	NE	NE
1,2-Dichloroethene (total)	ug/L	504.2	N/A	5000		ug/L	2501.0	Average	EPA 4 (1)	NE	NE	NE
Acetone	ug/L	32.7	N/A	250		ug/L	235.0	Average	EPA 4 (1)	NE	NE	NE
Chloroethane	ug/L	9.7	N/A	4.2		ug/L	4.2	Max	(4)	NE	NE	NE
Chloroform	ug/L	9.6	N/A	1.8		ug/L	1.8	Max	(4)	NE	NE	NE
cis-1,2-Dichloroethene	ug/L	18.3	N/A	260		ug/L	150.5	Average	EPA 4 (1)	NE	NE	NE
Tetrachloroethene	ug/L	9.7	N/A	3.3		ug/L	2.8	Average	EPA 4 (1)	NE	NE	NE
Vinyl Chloride	ug/L	138.8	N/A	2800		ug/L	1226.67	Average	EPA 4 (1)	NE	NE	NE
Arsenic	mg/l	0.002	0.003	0.003		mg/l	0.003	Max	EPA 4 (3)	NE	NE	NE
Cadmium	mg/l	0.001	0.001	0.002	J	mg/l	0.001	95% UCL-T	EPA 4 (2)	NE	NE	NE
Chromium	mg/l	0.004	0.005	0.01		mg/l	0.005	95% UCL-T	EPA 4 (2)	NE	NE	NE
Manganese	mg/l	0.1	1.75	0.5		mg/l	0.5	Max	EPA 4 (3)	NE	NE	NE

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Meant-T); Mean of Normal Data (Mean-N).

(1) Per EPA Region IV Guidance, groundwater EPCs were the arithmetic average of the wells in the maximally concentrated area (see Report Table 3-4) (Region 4 Bulletins, October 1996).

(2) Concentrations in metals in on-site groundwater were variable across the site. As a result, a 95% UCL was calculated for metal COPCs in on-site groundwater.

EPA Region IV Guidance indicates that it is appropriate to assume that sampling data are lognormally distributed (Region 4 Bulletins, October 1996).

(3) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

(4) The maximum detected concentration for chloroethane was used as the EPC because time compound was only detected once.

NE = Not Evaluated.

NA = Not Applicable

TABLE 3.8
MEDIUM-SPECIFIC EXPOSURE POINT CONCENTRATION SUMMARY
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: On-Site Deep Tap Water

Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Lognormal Data	Maximum Detected Concentration	Maximum Qualifier	EPC Units	Reasonable Maximum			Central Tendency		
							Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
1,1-Dichloroethane	ug/L	10.5	N/A	110		ug/L	38.0	Average	EPA 4 (1)	NE	NE	NE
1,2-Dichloroethene (total)	ug/L	7.6	N/A	29		ug/L	16	Average	EPA 4 (1)	NE	NE	NE
Chloroethane	ug/L	3.5	N/A	5.9		ug/L	5.9	Average	EPA 4 (1)	NE	NE	NE
cis-1,2-Dichloroethene	ug/L	4.6	N/A	25		ug/L	25.0	Average	EPA 4 (1)	NE	NE	NE
Vinyl Chloride	ug/L	11.0	N/A	110.0		ug/L	40.7	Average	EPA 4 (1)	NE	NE	NE
Aluminum	mg/l	1.8	2.80E+10	7.1		mg/l	7.1	Max	EPA 4 (3)	NE	NE	NE
Arsenic	mg/l	0.004	0.01	0.02		mg/l	0.01	95% UCL-T	EPA 4 (2)	NE	NE	NE
Cadmium	mg/l	0.001	0.002	0.01		mg/l	0.002	95% UCL-T	EPA 4 (2)	NE	NE	NE
Chromium	mg/l	0.02	0.04	0.1		mg/l	0.04	95% UCL-T	EPA 4 (2)	NE	NE	NE
Manganese	mg/l	0.065	40.3	0.18		mg/l	0.18	Max	EPA 4 (3)	NE	NE	NE

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-T); Mean of Log-transformed Data (Meant-T);
Mean of Normal Data (Mean-N).

(1) Per EPA Region IV Guidance, groundwater EPCs were the arithmetic average of the wells in the maximally concentrated area (see Report Table 3-4) (Region 4 Bulletins, October 1996).

(2) Concentrations in metals in on-site groundwater were variable across the site. As a result, a 95% UCL was calculated for metal COPCs in on-site groundwater.

EPA Region IV Guidance indicates that it is appropriate to assume that sampling data are lognormally distributed (Region 4 Bulletins, October 1996).

(3) 95% UCL exceeds maximum detected concentration. Therefore, maximum concentration used for EPC.

NE = Not Evaluated.

NA = Not Applicable

TABLE 4.2
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: On-Site Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= $C_s \times IR \times CF \times EF \times ED / BW \times AT$
	IR	Soil Ingestion Rate	mg/kg	200	EPA, 1996a			
	CF	Conversion Factor	kg/mg	1.00E-06	—			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	6	EPA, 1996a			
	BW	Body Weight	kg	15	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	2,190	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			
Dermal	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= $C_s \times CF \times SA \times AF \times ABS \times EF \times ED / BW \times AT$
	CF	Conversion Factor	kg/mg	1.00E-06	—			
	SA	Skin Surface Area	cm ² /day	1800	EPA, 1997			
	AF	Adherence Factor	mg/cm ²	1	EPA, 1996a			
	ABS	Dermal Absorption Factor	unitless	see text	(1)			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	6	EPA, 1996a			
	BW	Body Weight	kg	15	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	2,190	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			
Inhalation of Particulates	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= $C_s \times (1/PEF) \times IR \times EF \times ED / BW \times AT$
	PEF	Particulate Emission Factor	m ³ /kg	1.32E+09	EPA, 1996b			
	IR	Inhalation Rate	m ³ /day	15	EPA, 1997			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	6	EPA, 1996a			
	BW	Body Weight	kg	15	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	2,190	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			

(1) Chemical specific. If not available, the following defaults were used - 0.01 organic compounds; 0.001 - inorganic compounds.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

EPA, 1996b: EPA Soil Screening Guidance. EPA/540/R-95/128. May 1996.

EPA, 1997: EPA Exposure Factor Handbook. EPA/600/P-95/002Fa. August 1997.

TABLE 4.3
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: On-Site Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CS x IR x CF x EF x ED/BW x AT
	IR	Soil Ingestion Rate	mg/kg	100	EPA, 1996a			
	CF	Conversion Factor	kg/mg	1.00E-06	–			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	24	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	8,760	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			
Dermal	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CS x CF x SA x AF x ABS x EF x ED/BW x AT
	CF	Conversion Factor	kg/mg	1.00E-06	–			
	SA	Skin Surface Area	cm ² /day	5000	EPA, 1997			
	AF	Adherence Factor	mg/cm ²	1	EPA, 1996a			
	ABS	Dermal Absorption Factor	unitless	see text	(1)			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	24	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	8,760	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			
Inhalation of Particulates	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CS x (1/PEF) x IR x EF x ED/BW x AT
	PEF	Particulate Emission Factor	m ³ /kg	1.32E+09	EPA, 1996b			
	IR	Inhalation Rate	m ³ /day	20	EPA, 1997			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	24	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	8,760	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			

(1) Chemical specific. If not available, the following defaults were used - 0.01 organic compounds; 0.001 - inorganic compounds.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

EPA, 1996b: EPA Soil Screening Guidance. EPA/540/R-95/128. May 1996.

EPA, 1997: EPA Exposure Factor Handbook. EPA/600/P-95/002Fa. August 1997.

TABLE 4.4
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: On-Site Surface Soil
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CS x IR x CF x EF x ED/BW x AT
	IR	Soil Ingestion Rate	mg/kg	50	EPA, 1996a			
	CF	Conversion Factor	kg/mg	1.00E-06	–			
	EF	Exposure Frequency	days/year	250	EPA, 1996a			
	ED	Exposure Duration	years	25	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	9,125	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA 1989			
Dermal	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CS x CF x SA x AF x ABS x EF x ED/BW x AT
	CF	Conversion Factor	kg/mg	1.00E-06	–			
	SA	Skin Surface Area	cm ² /day	5000	EPA 1997			
	AF	Adherence Factor	mg/cm ²	1	EPA, 1996a			
	ABS	Dermal Absorption Factor	unitless	see text	(1)			
	EF	Exposure Frequency	days/year	250	EPA, 1996a			
	ED	Exposure Duration	years	25	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	9,125	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			
Inhalation of Particulates	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CS x (1/PEF) x IR x EF x ED/BW x AT
	PEF	Particulate Emission Factor	m ³ /kg	6.60E+08	EPA, 1996b			
	IR	Inhalation Rate	m ³ /day	20	EPA, 1996a			
	EF	Exposure Frequency	days/year	250	EPA, 1996a			
	ED	Exposure Duration	years	25	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	9,125	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			

(1) Chemical specific. If not available, the following defaults were used - 0.01 organic compounds; 0.001 - inorganic compounds.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

EPA, 1996b: EPA Soil Screening Guidance. EPA/540/R-95/128. May 1996.

EPA, 1997: EPA Exposure Factor Handbook. EPA/600/P-95/002Fa. August 1997.

TABLE 4.6
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future Medium: Subsurface Soil Exposure Medium: Air Exposure Point: Volatiles in Outdoor Air Receptor Population: Resident Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation of Volatiles	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= $CS \times (1/VF) \times IR \times EF \times ED/BW \times AT$
	VF	Volatilization Factor	m ³ /kg	Chemical Specific	(1)			
	IR	Inhalation Rate	m ³ /day	15	EPA, 1996a			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	6	EPA, 1996a			
	BW	Body Weight	kg	15	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	2190	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25550	EPA, 1989			

(1) Chemical specific. Volatilization factors were determined based on methodologies and default values presented in the EPA Soil Screening Guidance (EPA, 1996b)

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

TABLE 4.7
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future Medium: Subsurface Soil Exposure Medium: Air Exposure Point: Volatiles in Outdoor Air Receptor Population: Resident Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation of Volatiles	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= $CS \times (1/VF) \times IR \times EF \times ED/BW \times AT$
	VF	Volatilization Factor	m ³ /kg	Chemical Specific	(1)			
	IR	Inhalation Rate	m ³ /day	20	EPA, 1996a			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	24	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	8760	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25550	EPA, 1989			

(1) Chemical specific. Volatilization factors were determined based on methodologies and default values presented in the EPA Soil Screening Guidance (EPA, 1996b)

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

TABLE 4.8
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Volatiles in Outdoor Air
Receptor Population: Industrial Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Inhalation of Volatiles	CS	Exposure Point Concentration in Soil	mg/kg	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= $CS \times (1/VF) \times IR \times EF \times ED/BW \times AT$
	VF	Volatilization Factor	m ³ /kg	Chemical Specific	(1)			
	IR	Inhalation Rate	m ³ /day	20	EPA, 1996a			
	EF	Exposure Frequency	days/year	250	EPA, 1996a			
	ED	Exposure Duration	years	25	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	9125	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25550	EPA, 1989			

(1) Chemical specific. Volatilization factors were determined based on methodologies and default values presented in the EPA Soil Screening Guidance (EPA, 1996b)

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

TABLE 4.9
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future Medium: Groundwater Exposure Medium: Groundwater Exposure Point: Volatiles On-Site Tap Water Receptor Population: Resident Receptor Age: Child
--

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	EPC in Groundwater	mg/L	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CW x IR x EF x ED/BW x AT
	IR	Ingestion Rate	L/day	1	EPA, 1996a			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	6	EPA, 1996a			
	BW	Body Weight	kg	15	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	2,190	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

TABLE 4.10
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future Medium: Groundwater Exposure Medium: Groundwater Exposure Point: Volatiles On-Site Tap Water Receptor Population: Resident Receptor Age: Adult
--

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	CT Value	CT Rationale/Reference	Intake Equation/Model Name
Ingestion	CW	EPC in Groundwater	mg/L	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CW x IR x EF x ED/BW x AT
	IR	Inhalation Rate	L/day	2	EPA, 1996a			
	EF	Exposure Frequency	days/year	350	EPA, 1996a			
	ED	Exposure Duration	years	24	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	8,760	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

TABLE 4.11
VALUES USED FOR DAILY INTAKE CALCULATIONS
SOLITRON MICROWAVE SITE

Scenario Timeframe: Future Medium: Groundwater Exposure Medium: Groundwater Exposure Point: On-Site Tap Water Receptor Population: Industrial Worker Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	EPC in Groundwater	mg/L	See Table 3	See Table 3			Chronic daily intake (CDI)(mg/kg-day)= CW x IR x EF x ED/BW x AT
	IR	Ingestion Rate	L/day	1	EPA, 1996a			
	EF	Exposure Frequency	days/year	250	EPA, 1996a			
	ED	Exposure Duration	years	25	EPA, 1996a			
	BW	Body Weight	kg	70	EPA, 1996a			
	AT-N	Averaging Time (non-cancer)	days	9,125	EPA, 1989			
	AT-C	Averaging Time (cancer)	days	25,550	EPA, 1989			

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol. 1: Human Health Evaluation Manual, Part A. OERR. EPA/5440/1-89/002.

EPA, 1996a: EPA Region IV Bulletins. October 1996.

TABLE 5.1
CHRONIC NON-CANCER TOXICITY DATA – ORAL/DERMAL
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
1,1-Dichloroethane	Chronic	1.00E-01	mg/kg-day	1.00E+00	1.00E-01	mg/kg-day	None Observed	1000/1	HEAST	07/01/97
1,1-Dichloroethene	Chronic	9.00E-03	mg/kg-day	1.00E+00	9.00E-03	mg/kg-day	Liver Lesions	1000/1	IRIS	01/10/00
1,2,4-Trimethylbenzene	Chronic	5.00E-02	mg/kg-day	8.00E-01	4.00E-02	mg/kg-day			NCEA	10/01/99
Acetone	Chronic	1.00E-01	mg/kg-day	8.30E-01	8.30E-02	mg/kg-day	Increased liver and kidney weights; kidney toxicity	1000/1	IRIS	01/10/00
Chloroethane	Chronic	4.00E-01	mg/kg-day	8.00E-01	3.20E-01	mg/kg-day		300/1	NCEA	10/07/99
Chloroform	Chronic	1.00E-02	mg/kg-day	2.00E-01	2.00E-03	mg/kg-day	Liver	1000/1	IRIS	01/10/00
cis-1,2-Dichloroethene	Chronic	1.00E-02	mg/kg-day	1.00E+00	1.00E-02	mg/kg-day	Blood	3000/1	HEAST	07/01/97
Tetrachloroethene	Chronic	1.00E-02	mg/kg-day	1.00E+00	1.00E-02	mg/kg-day	Hepatotoxicity in Mice/Weight Gain	1000/1	IRIS	01/10/00
trans-1,2-Dichloroethene	Chronic	2.00E-02	mg/kg-day	1.00E+00	2.00E-02	mg/kg-day	Blood	1000/1	IRIS	01/10/00
Trichloroethene (TCE)	Chronic	6.00E-03	mg/kg-day	1.00E+00	6.00E-03	mg/kg-day			NCEA	10/07/99
Vinyl Chloride	Chronic	NTV		1.00E+00	NTV					
Naphthalene	Chronic	2.00E-02	mg/kg-day	8.90E-01	1.78E-02	mg/kg-day	Decreased mean terminal body weight in males	3000/1	IRIS	01/10/00

NTV = Not Available

(1) Refer to EPA Region IV Risk Assessment Guidance (October 1996). See Table 4-4 in the Baseline Human Health Risk Assessment for Glabs references.

(2) Adjusted Dermal RfD calculated by multiplying Oral RfD by GI_{abs} factor.

(3) For IRIS values, provide the date IRIS was searched.

For HEAST values, provide the date of HEAST.

For NCEA values, provide the date of article provided by NCEA (10/7/97). NCEA values obtained from EPA Region III RBC Table.

TABLE 5.1 (continued)
CHRONIC NON-CANCER TOXICITY DATA -- ORAL/DERMAL
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
Aluminum	Chronic	1.00E+00	mg/kg-day	1.00E+00	1.00E+00	mg/kg-day			NCEA	10/07/99
Arsenic	Chronic	3.00E-04	mg/kg-day	9.50E-01	2.85E-04	mg/kg-day	Hyperpigmentation and keratosis; possible vascular complications	3/1	IRIS	01/10/00
Cadmium (water)	Chronic	5.00E-04	mg/kg-day	2.50E-02	1.25E-05	mg/kg-day	Proteinuria (protein in urine)	10/1	IRIS	01/10/00
Cadmium (food)		1.00E-03	mg/kg-day	5.00E-02	5.00E-05	mg/kg-day	Proteinuria (protein in urine)	10/1	IRIS	01/10/00
Chromium VI	Chronic	3.00E-03	mg/kg-day	2.50E-02	7.50E-05	mg/kg-day	None reported	300/3	IRIS	01/10/00
Copper	Chronic	3.71E-02	mg/kg-day	5.70E-01	2.11E-02	mg/kg-day	Gastrointestinal irritation		HEAST	07/01/97
Manganese (food)	Chronic	7.00E-02	mg/kg-day	6.00E-02	4.20E-03	mg/kg-day	Central nervous system effects	1/1	IRIS	01/10/00
Manganese (nondiet)	Chronic	2.33E-02	mg/kg-day	6.00E-02	1.40E-03	mg/kg-day	Central nervous system effects	1/3	IRIS	01/10/00
Mercury	Chronic	3.00E-04	mg/kg-day	7.00E-02	2.10E-05	mg/kg-day	Neurological	1000/1	IRIS	04/01/00
Molybdenum	Chronic	5.00E-03	mg/kg-day	3.80E-01	1.90E-03	mg/kg-day	Increased Uric Acid Levels	30/1	IRIS	01/10/00
Nickel	Chronic	2.00E-02	mg/kg-day	4.00E-02	8.00E-04	mg/kg-day	Decreased body weight and organ weights	300/1	IRIS	01/10/00
Silver	Chronic	5.00E-03	mg/kg-day	4.00E-02	2.00E-04	mg/kg-day	Argyria (silver deposition in skin)	3/1	IRIS	01/10/00
Yttrium	Chronic	NTV		2.00E-01	NTV					

NTV = Not Available

(1) Refer to EPA Region IV Risk Assessment Guidance (October 1996). See Table 4-4 in the Baseline Human Health Risk Assessment for GIabs references.

(2) Adjusted Dermal RfD calculated by multiplying Oral RfD by GI_{abs} factor.

(3) For IRIS values, provide the date IRIS was searched.

For HEAST values, provide the date of HEAST.

Far NCEA values, provide the date of article provided by NCEA (10/7/97). NCEA values obtained from EPA Region III RBC Table.

TABLE 5.2
CHRONIC NON-CANCER TOXICITY DATA – INHALATION
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
1,1-Dichloroethane	Chronic	4.90E-01	mg/m ³	1.40E+01	mg/kg-day	Kidney	1000/1	HEAST	07/01/97
1,1-Dichloroethene	Chronic	NTV		NTV					
1,2,4-Trimethylbenzene	Chronic	5.95E-03	mg/m ³	1.70E-03	mg/kg-day			NCEA	10/07/99
Acetone	Chronic	NTV		NTV					
Chloroethane	Chronic	1.02E+01	mg/m ³	2.90E-00	mg/kg-day	Delayed Fetal Ossification	300/1	IRIS	01/10/00
Chloroform	Chronic	3.01E-04	mg/m ³	8.60E-05	mg/kg-day			NCEA	10/07/99
cis-1,2-Dichloroethene	Chronic	NTV		NTV					
Tetrachloroethene	Chronic	4.90E-01	mg/m ³	1.40E-01	mg/kg-day			NCEA	10/07/99
trans-1,2-Dichloroethene	Chronic	NTV		NTV					
Trichloroethene (TCE)	Chronic	NTV		NTV					
Vinyl Chloride	Chronic	NTV		NTV					
Naphthalene	Chronic	3.00E-03	mg/m ³	8.57E-04	mg/kg-day	Nasal Effects	3000/1	IRIS	01/10/00

NTV - Not Available

(1) Calculated by (Value Inhalation RfC * 20)/70

(2) For IRIS values, provide the date IRIS was searched.

For HEAST values, provide the date of HEAST.

For NCEA values, provide the date of article provided by NCEA (10/7/97). NCEA values obtained from EPA Region III RBC Table.

TABLE 5.2 (continued)
CHRONIC NON-CANCER TOXICITY DATA – INHALATION
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfC:RfD: Target Organ	Dates (2) (MM/DD/YY)
Aluminum	Chronic	3.50E-03	mg/m ³	1.00E-03	mg/kg-day			NCEA	10/07/99
Arsenic	Chronic	NTV		NTV					
Cadmium (water)	Chronic	NTV		NTV					
Cadmium (food)	Chronic	NTV		NTV					
Chromium VI	Chronic	1.00E-04	mg/m ³	2.86E-05	mg/kg-day	Lactase dehydrogenase in bronchioalveolar lavage fluid	300/1	IRIS	01/10/00
Copper	Chronic	NTV		NTV					
Manganese (food)	Chronic	NTV		NTV					
Manganese (nondiet)	Chronic	5.00E-05	mg/m ³	1.43E-05	mg/kg-day	Impairment of neuro- behavioral function	1000/1	IRIS	01/10/00
Mercury	Chronic	3.00E-04	mg/m ³	8.75E-05	mg/kg-day	Hand Tremor; memory	1000/1	IRIS	04/01/00
Molybdenum	Chronic	NTV		NTV					
Nickel	Chronic	NTV		NTV					
Silver	Chronic	NTV		NTV					
Yttrium	Chronic	NTV		NTV					

NTV - Not Available

(1) Calculated by (Value Inhalation RfC * 20)/70

(2) For IRIS values, provide the date IRIS was searched.

For HEAST values, provide the date of HEAST.

For NCEA values, provide the date of article provided by NCEA (10/7/97). NCEA values obtained from EPA Region III RBC Table.

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor	Adjusted Dermal Cancer Slope Factor (1)	Units	Weight of Evidence/ Cancer Guideline Description	Source Target Organ	Date (2) (MM/DD/YY)
1,1-Dichloroethane	NTV	1.00E+00	NTV	(mg/kg-day) ⁻¹	C		1/10/2000
1,1-Dichloroethene	0.6	1.00E+00	0.6	(mg/kg-day) ⁻¹	C	adrenal pheochromocytomas	1/10/2000
1,2,4-Trimethylbenzene	NTV	8.00E-01	NTV	(mg/kg-day) ⁻¹	Not Available		
Acetone	NC	8.30E-01	NC	(mg/kg-day) ⁻¹	D		1/10/2000
Chloroethane	0.0029	8.00E-01	0.0036	(mg/kg-day) ⁻¹	Not Available		10/7/1999
Chloroform	0.0061	2.00E-01	0.031	(mg/kg-day) ⁻¹	B2	Kidney	1/10/2000
cis-1,2-Dichloroethene	NC	1.00E+00	NC	(mg/kg-day) ⁻¹	D		1/10/2000
Tetrachloroethene	0.052	1.00E+00	0.052	(mg/kg-day) ⁻¹	Not Classified		10/7/1999
trans-1,2-Dichloroethene	NTV	1.00E+00	NTV	(mg/kg-day) ⁻¹	Not Classified		
Trichloroethene (TCE)	0.011	1.00E+00	0.011	(mg/kg-day) ⁻¹	Not Classified		10/7/1999
Vinyl Chloride	1.9	1.00E+00	1.9	(mg/kg-day) ⁻¹	A	Lung./Liver	07/01/97
Naphthalene	NTV	8.90E+01	NTV	(mg/kg-day) ⁻¹	C		1/10/2000

EPA Group:

A- Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and
inadequate or no evidence in humans

C- Possible human carcinogen

(1) Divided Oral Slope Factor by Oral to Dermal Adjustment Factor.

(2) For IRIS values, provide the date IRIS was searched (1/10/2000).

For HEAST values, provide the date of HEAST (7/1/97).

For NCEA values, provide the date of article provided by NCEA (10/7/97). NCEA values obtained from EPA Region III RBC Table.

NTV = Not Available

NC = Not Classified as a Carcinogen

TABLE 6.1 (continued)
CANCER TOXICITY DATA -- ORAL/DERMAL
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor	Adjusted Dermal Cancer Slope Factor (1)	Units	Weight of Evidence/ Cancer Guideline Description	Source Target Organ	Date (2) (MM/DD/YY)
Aluminum	NC	1.00+00	NC	(mg/kg-day) ⁻¹	Not Available		
Arsenic	1.5	9.50E-01	1.5	(mg/kg-day) ⁻¹	A	Skin Cancer	1/10/2000
Cadmium	NTV	2.50E-02	NTV	(mg/kg-day) ⁻¹	B1		1/10/2000
Chromium VI	NTV	2.50E-02	NTV	(mg/kg-day) ⁻¹	A		1/10/2000
Copper	NC	5.70E-01	NC	(mg/kg-day) ⁻¹	D		1/10/2000
Manganese	NC	6.00E-02	NC	(mg/kg-day) ⁻¹	D		1/10/2000
Mercury	NC	7.00E-02	NC	(mg/kg-day) ⁻¹	D		4/1/2000
Molybdenum	NTV	3.80E-01	NTV	(mg/kg-day) ⁻¹	Not Classified		1/10/2000
Nickel	NTV	4.00E-02	NTV	(mg/kg-day) ⁻¹	A		1/10/2000
Silver	NC	4.00E-02	NC	(mg/kg-day) ⁻¹	D		1/10/2000
Yttrium	NTV	2.00E-01	NTV	(mg/kg-day) ⁻¹	Not Available		

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and
inadequate or no evidence in humans

C- Possible human carcinogen

(1) Divided Oral Slope Factor by Oral to Dermal Adjustment Factor.

(2) For IRIS values, provide the date IRIS was searched.

For HEAST values, provide the date of HEAST.

For NCEA values, provide the date of article provided by NCEA (10/7/97). NCEA values obtained from EPA Region III RBC Table.

NTV = Not Available

NC = Not Classified as a Carcinogen

TABLE 6.2
CANCER TOXICITY DATA – INHALATION
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (2) (MM/DD/YY)
1,1-Dichloroethane	NTV		(Unit Risk * 70)/ 0.02	NTV	(mg/kg-day) ⁻¹	C	IRIS	1/10/00
1,1-Dichloroethene	5.00E-05	ug/m ³	(Unit Risk * 70)/ 0.02	1.75E-01	(mg/kg-day) ⁻¹	C	IRIS	1/10/00
1,2,4-Trimethylbenzene	NTV		(Unit Risk * 70)/ 0.02	NTV	(mg/kg-day) ⁻¹	Not Available		
Acetone	NC		(Unit Risk * 70)/ 0.02	NC	(mg/kg-day) ⁻¹	D	IRIS	1/10/00
Chloroethane	NTV		(Unit Risk * 70)/ 0.02	NTV	(mg/kg-day) ⁻¹	Not Available		
Chloroform	2.31E-05	ug/m ³	(Unit Risk * 70)/ 0.02	8.10E-02	(mg/kg-day) ⁻¹	B2	IRIS	1/10/00
cis-1,2-Dichloroethene	NC		(Unit Risk * 70)/ 0.02	NC	(mg/kg-day) ⁻¹	D	IRIS	1/10/00
Tetrachloroethene	5.71E-07	ug/m ³	(Unit Risk * 70)/ 0.02	2.00E-03	(mg/kg-day) ⁻¹	Not Classified	NCEA	10/7/1999
trans-1,2-Dichloroethene	NTV		(Unit Risk * 70)/ 0.02	NTV	(mg/kg-day) ⁻¹	Not Classified	IRIS	1/10/00
Trichloroethene (TCE)	1.71E-06	ug/m ³	(Unit Risk * 70)/ 0.02	6.00E-03	(mg/kg-day) ⁻¹	Not Classified	NCEA	10/7/1999
Vinyl Chloride	8.57E-05	ug/m ³	(Unit Risk * 70)/ 0.02	3.00E-01	(mg/kg-day) ⁻¹	A	HEAST	07/01/97
Naphthalene	NTV		(Unit Risk * 70)/ 0.02	NTV	(mg/kg-day) ⁻¹	C		

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

NCEA - National Center for Environmental Assessment

(1) For IRIS values, provide the date IRIS was searched

For HEAST values, provide the date of HEAST.

For NCEA values, provide the date off article provided by NCEA.

EPA Group:

A- Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and
inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classified as a human carcinogen

E - Evidence of noncarcinogenicity

NTV - Not Available

NC - Not Classified as a Carcinogen

TABLE 6.2 (continued)
CANCER TOXICITY DATA – INHALATION
SOLITRON MICROWAVE SITE

Chemical of Potential Concern	Unit Risk	Units	Adjustment	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (2) (MM/DD/YY)
Aluminum	NC		(Unit Risk * 70)/ 0.02	NC	(mg/kg-day) ⁻¹	Not Available		
Arsenic	4.30E-03	ug/m ³	(Unit Risk * 70)/ 0.02	1.51E+01	(mg/kg-day) ⁻¹	A	IRIS	1/10/00
Cadmium	1.80E-03	ug/m ³	(Unit Risk * 70)/ 0.02	6.30E+00	(mg/kg-day) ⁻¹	B1	IRIS	1/10/00
Chromium VI	1.17E-02	ug/m ³	(Unit Risk * 70)/ 0.02	4.10E+01	(mg/kg-day) ⁻¹	A	IRIS	1/10/00
Copper	NC		(Unit Risk * 70)/ 0.02	NC	(mg/kg-day) ⁻¹	D		
Manganese	NC		(Unit Risk * 70)/ 0.02	NC	(mg/kg-day) ⁻¹	D		
Mercury	NC		(Unit Risk * 70)/ 0.02	NC	(mg/kg-day) ⁻¹	D	IRIS	4/2/00
Molybdenum	NTV		(Unit Risk * 70)/ 0.02	NTV	(mg/kg-day) ⁻¹	Not Classified		
Nickel	2.40E-04	ug/m ³	(Unit Risk * 70)/ 0.02	8.40E-01	(mg/kg-day) ⁻¹	A	IRIS (Nickel Refinery Dust)	1/10/00
Silver	NC		(Unit Risk * 70)/ 0.02	NC	(mg/kg-day) ⁻¹	D		
Yttrium	NTV		(Unit Risk * 70)/ 0.02	NTV	(mg/kg-day) ⁻¹	Not Available		

IRIS = Integrated Risk Information System

HEAST = Health Effects Assessment Summary Tables

NCEA - National Center for Environmental Assessment

(1) For IRIS values, provide the date IRIS was searched.

For HEAST values, provide the date of HEAST.

For NCEA values, provide the date off article provided by NCEA.

EPA Group:

A- Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and
inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classified as a human carcinogen

E - Evidence of noncarcinogenicity

NTV - Not Available

NC - Not Classified as a Carcinogen

APPENDIX B

Responsiveness Summary

APPENDIX B

Responsiveness Summary Solitron Microwave Site

The public comment period on the draft proposed plan for the Solitron Microwave Site was held from July 12 to August 11, 2000. The comments received during this time are summarized below. This responsiveness summary addresses the comments received during the public comment period.

- 1) What will be done during excavation of the soil to prevent soil contaminants from becoming airborne?

EPA Response: The remedy will be designed to limit the potential for exposure to dust resulting from the excavation of contaminated soil. Preventative measures such as air sampling and wetting of the soil will be used as appropriate to prevent exposure to airborne contaminants.

- 2) If chemical oxidation (alternative GW-5) is shown to take longer to design and implement than in-well air stripping (alternative GW-4), then wouldn't GW-4 be preferable?

EPA Response: After comparing all alternatives against the "nine criteria" (see Chapter 10.0 "Summary of Comparative Analysis of Alternatives" of this ROD), EPA selected alternative GW-5 as the preferred remedy. GW-5 also was shown to be the quickest method to remediate the groundwater.

- 3) Many residents were concerned about the current condition of their drinking water wells and the drinking water wells of their neighbors.

EPA Response: The Martin County Health Department sampled various private wells north and east of the Site in 1991, 1992, 1993, 1995, 1998, and 1999. The results of this sampling are discussed on page 2-2 of this ROD and shown in Figure 2-2. The most recent sampling was conducted in the summer of 1999. A total of 87 wells were tested. Nine of the wells had low levels of site-related contaminants, but none were above the drinking water standard. EPA, in conjunction with the Martin County Health Department will continue to sample residential wells, as appropriate, until the water lines have been extended. In 1998, 29 wells were sampled. Two private wells contained site related contaminants at levels above primary drinking water standards. These homes were connected to the public water system. Site related contaminants were detected in 16 wells at levels below drinking water standards.

- 4) One person suggested that the on-site building be torn down and the percolation pond filled.

EPA Response: EPA's authority under CERCLA (Superfund) gives EPA the authority to take the cleanup actions necessary to protect human health and the environment. Sampling results from EPA's remedial investigation show that it is not necessary to demolish the existing building or fill in the percolation pond to protect human health or the environment. Therefore, EPA cannot spend federal money to conduct these actions.

- 5) Solitron should be made to pay for the cleanup.

EPA Response: Under Superfund authority, EPA vigorously seeks responsible parties to fund investigations and cleanups. The vast majority of sites currently being addressed by Superfund in Region 4 are being funded by Potentially Responsible Parties (PRPs). At this site, Solitron was the only entity found that could be designated by EPA as a PRP. EPA, after a thorough examination of Solitron's finances concluded that Solitron was not financially able to conduct the investigation or cleanup. EPA therefore, is using money out of the Superfund to conduct these actions. However, any proceeds from the sale of the property in the future will go to the federal government to reimburse the government for expenses incurred in this response action.

- 6) Several residents requested their well be tested and they be connected to public water at no cost.

EPA Response: EPA, through groundwater sampling and a comprehensive study of the area, has determined the area which could be affected by groundwater contamination from the Site prior to completion of the cleanup action. EPA only has the authority to take an action under Superfund to protect human health and the environment. Therefore, if someone's home is located outside of the area which has been determined by EPA to require connection to public water, then EPA cannot use federal Superfund money to connect them to public water. However, Martin County is pursuing a grant which could be used to extend public water in this area further than will be extended as part of the Superfund action.

- 7) One resident was concerned about bathing in the well water.

EPA Response: When EPA evaluates the risks associated with contamination from a site, many "pathways" by which people can be exposed to contamination are evaluated. For potential exposure to groundwater, the primary pathway by which people can be exposed is through ingestion (drinking). However, inhalation of vapors while bathing is also evaluated. The groundwater cleanup level present in the ROD was determined through the risk assessment process to be protective of human health and acceptable for

drinking and bathing. The groundwater cleanup levels were not exceeded in any of the private wells tested in 1999. Therefore, bathing in well water should not cause human health concerns.

- 8) Some residents voiced a concern about future migration of groundwater contamination.

EPA Response: Water lines are being extended to a portion of the neighborhood to prevent potential exposure to groundwater contaminants while the groundwater is being remediated. Part of the selected remedy for groundwater is monitored natural attenuation. This will entail the establishment of a monitoring network to monitor the entire plume while contaminants naturally attenuate to below the cleanup levels. Therefore, any migration of the contaminant plume will be detected.

- 9) One resident requested that fire hydrants be installed when the water lines are extended.

EPA Response: EPA may only use federal Superfund money to protect human health and the environment from releases of contamination. Therefore, EPA cannot install fire hydrants for fire protection as part of the remedy.

- 10) One resident felt that the water line extensions should be expedited and installed prior to 2002.

EPA Response: After reaching a cleanup decision and issuing a ROD, the remedy must be designed prior to implementation. This phase, called the remedial design, will be conducted as expeditiously as possible. During the remedial design, another round of residential well sampling will be conducted to ensure concentrations in existing drinking water wells are below the drinking water standards.

- 11) EPA should reimburse residents for bottled water until county water is available whether or not their water is contaminated.

EPA Response: EPA may only use federal money to provide bottled water to residents in situations where the contaminant levels in their drinking water wells exceed primary, health based drinking water standards or are expected to exceed primary drinking water standards in a short amount of time. Also, this is usually done when connection to municipal water is not available in a reasonable amount of time. At this site, all residents in the area whose wells had unacceptable levels of site related contaminants have been connected to municipal water. This should not be confused with the portion of the remedy which calls for extending water lines in the community. The water lines are being extended to address a potential long term threat while the cleanup occurs. However, the State of Florida has a trust fund which can be used to provide bottled water if residents' drinking water wells exceed primary or secondary drinking water standards. This concern was forwarded to the State of Florida.

- 12) A contingency should be added that if homes outside the area planned for public water connections are found to contain Solitron-related contaminants in the future, public water will be extended to those homes.

EPA Response: EPA's remedy is designed to completely remediate the groundwater so that the groundwater will be available for unrestricted use. Part of the remedy calls for monitored natural attenuation. This means that a monitoring network consisting of existing and potentially new groundwater monitoring wells will be regularly sampled to monitor the contaminant plume. This monitoring will ensure that the groundwater contaminants continue to decrease and that the plume does not migrate. If the groundwater contaminants were to move out of the monitoring area, then the area would be expanded and if necessary the remedy could be revised.

- 13) The Proposed Plan should call for a change in zoning of the surrounding properties currently zoned as residential and commercial to include retail and light manufacturing.

EPA Response: EPA does not have the authority over zoning of properties and therefore, cannot require rezoning as part of a remedy. Changes in the zoning of property must be done through the Martin County Board of County Commissioners.

- 14) Will EPA consider expanding the area to which public water lines will be extended? The Port Salerno Neighborhood Advisory Committee (NAC) recommends extending the area to be connected to public water lines from Murray Street on the south to Salerno Road on the north and from the ditch west of Kingfish to the FEC right-of-way in the east. The NAC is recommending that the Martin County Board of County Commissioners support their application for a Community Development Block Grant to provide utilities for the area north of Salerno Road and would coordinate that activity with the EPA project. Martin County would also provide design and administrative services during implementation.

EPA Response:

After careful consideration of the available data and public comments, EPA has determined that the proposed service area for water line extensions is still the most appropriate area at this time. The proposed service area includes the farthest reach of site related contamination. It has taken more than 30 years for the groundwater contamination to reach the proposed limits of the service area, which is approximately 3/8 mile north and east of the Site. The contamination is not continuous throughout the planned service area, but is scattered sporadically within the area. Contaminant migration will be reduced even further with the implementation of the planned remedy because: 1) once the water lines are in place, there will be a reduction in the number of private wells that will be pumping which will reduce the potential for pumping-induced

movement of contaminants; and 2) the remedy will reduce the high levels of groundwater contamination found on-site, thus reducing the amount of chemicals that could migrate to the outer edges of the plume. Finally, there will be a long term groundwater monitoring program in place to confirm what happens to the contaminants. Given these factors, it is not necessary to expand the water line service area beyond what is currently planned.

- 15) The off-site contribution to the plume by the junkyard located across Cove Road and to the east has not been evaluated to eliminate this potential source of plume contribution. The Martin County Health Department stated at the July 24, 2000, public hearing that testing of some of the off-site private wells has found contamination not associated with Solitron.

EPA Response: The Remedial Investigation shows that groundwater contamination from the Solitron Site has migrated off-site in the direction of groundwater flow and has impacted residential wells. The purpose of this ROD is to address this contamination. If additional sources of groundwater contamination are present in the area, they must be evaluated separately through the Superfund program beginning with a preliminary assessment. Sampling of the residential wells around the junkyard does not indicate that another significant source of groundwater contamination is present. As is common at most Superfund sites, other groundwater contaminants may be present in the area. Analytical methods allow for the detection of contaminants at very low levels. The contaminant mentioned by the Martin County Health Department was bromobenzene and is not being addressed through this action since it is not from the Solitron Site.

- 16) Since installation of public water lines to the properties whose private wells had exceedances of drinking water standards in the 1992-93 period, the subsequent periodic sampling of other downstream private wells have revealed no exceedances, strongly indicating that the plume is not moving. Therefore, there is no justification for using federal Superfund money to provide public water line extensions to 150 additional homes in the area nor the further extension being suggested by the County to enlarge the area being supplied by public water.

EPA Response: The private well sampling actually indicates the continued impact of site related contaminants upon private wells. In 1998, two additional wells were found to have vinyl chloride that exceeded the state and federal drinking water standards as well as detectable levels of other site related contaminants such as 1,1-dichloroethane and 1,2-DCE. Those homes were connected to public water. In addition, there are several other wells that were last sampled in 1998 that had detectable levels of these or other site related contaminants. Finally, some of the wells that have been sampled on several occasions between 1991-1999 did not show detectable levels of site related contaminants until the more recent sampling events in 1998 and 1999. Thus, it is

- 19) What areas of the Site will be affected by the EPA cleanup? Are there areas which could be used for other purposes before the cleanup is finished?

EPA Response: Generally speaking, the upper northeast quadrant of the Site will not be able to be used while the active cleanup measures (soil removal and chemical oxidation) are occurring. However, those areas of the Site not affected by the cleanup will be accessible for other uses. After completion of the remedial design, a more accurate description of the area necessary to be accessed for cleanup will be available.

- 20) Who will be responsible for paying the water bills in the future after they are connected to public water?

EPA Response: EPA can pay for extension and connection to public water. However, residents will be responsible for paying their water bills.

- 21) Could the groundwater contamination get into other little creeks and migrate to the Manatee Pocket area?

EPA Response: It is highly unlikely. The contaminants present in the groundwater at this site are heavier than water and therefore, tend to sink once in the groundwater. This would prevent them from entering a surface water body.

- 22) Did EPA sample for contaminants in addition to the contaminants known to have been used at the Site?

EPA Response: EPA tested for a range of organic compounds. However, the Superfund program only provides EPA the authority to address contaminants related to the Site. The Martin County Health Department tested for more chemicals than those related to the Solitron Site. In some wells, chemicals were detected that were not related to the Solitron Site. These could be from many sources including improper disposal of gasoline, used motor oil, cleaning materials, or improper use of residential pesticides.